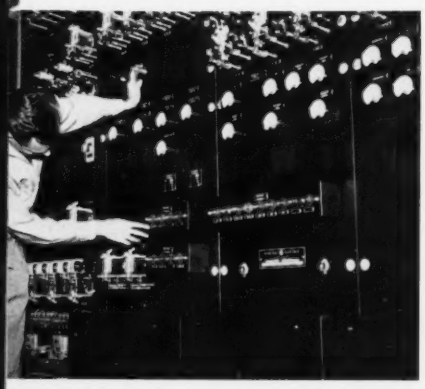
ELECTRICAL WEST

October 1953
25 Cents

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U.S.



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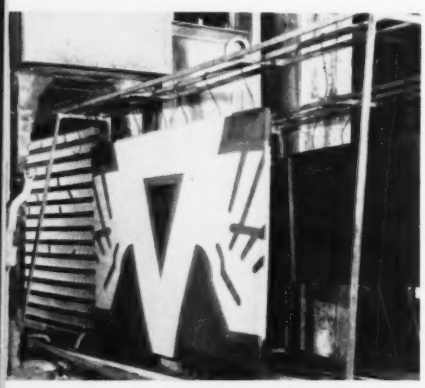

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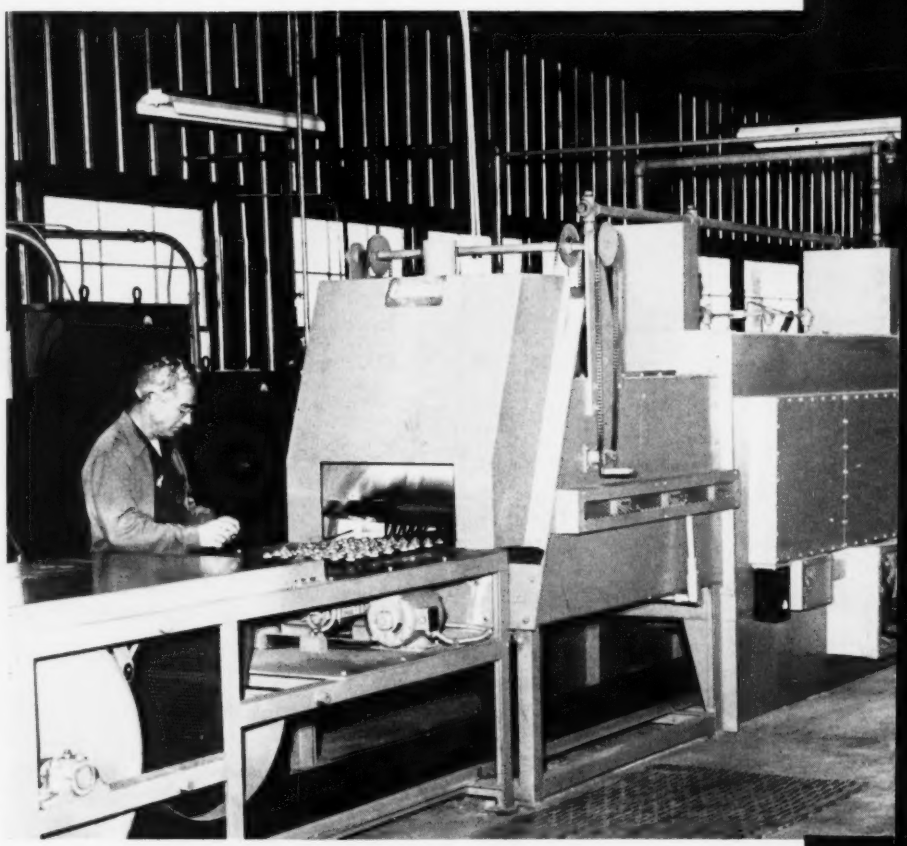

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Annual Industrial Issue

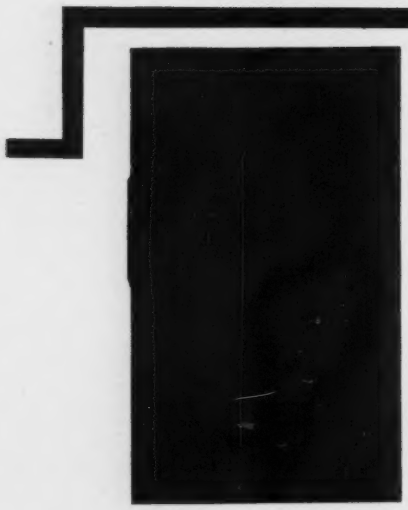
simple selling formula:

÷ 60!

It's amazing how often something simple can turn out to be very effective. Like the formula prescribed in current Edison newspaper advertisements, for instance.

Dividing a two-month Edison bill by sixty to show how little Edison customers pay for electric service each day has a real selling impact. For one thing, it hits home—each customer is working with his *own* actual cost, not an average or a minimum. For another, it really emphasizes the extremely low amount paid for electric service.

Any customer can figure his cost of electric service—and on his *own* figures, it's today's biggest bargain!



Edison

SOUTHERN CALIFORNIA EDISON COMPANY

IN THE MANUFACTURING CYCLE ALL G-E I-50 METERS PASS 18 ELECTRICAL TESTS AND 356 POINTS OF INSPECTION . . .

Precision Quality-control in Manufacture Assures Accuracy of Certified I-50 Meters

General Electric I-50 watthour meters can be certified for accuracy and performance only because of a completely new design. This design embraces new methods of construction, new materials, and—of prime importance—new manufacturing techniques.

LATEST METHODS of quality control are major contributing factors in the certification of I-50's. This precision control of quality makes it possible to factory certify that more than 99.9% I-50 meters are free from defects that might cause improper registration or operation.

DURING MANUFACTURE each I-50 passes a rigid inspection and testing schedule. In final inspection every meter passes 54 separate points of inspection before receiving the "gold seal of certification"—your assurance of an accurate and dependable meter.

For more information, see the color movie, "Accent on Accuracy." Call your nearest G-E representative or write General Electric, Schenectady 5, N. Y.

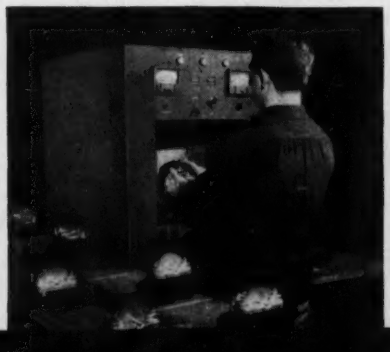
601-99

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

REGISTER RATIO is precision checked on special test stands where each register is spun rapidly and compared with standard.

GENERAL ELECTRIC

FLOATING DISCS are individually inspected on an oscilloscope to detect any magnetic particles or foreign matter.



FINAL HIGH-POTENTIAL TEST of each I-50 watthour meter is at 3000 volts—several times higher than industry requirements.

QUALITY-CONTROL stations, maintained by laboratory, act as double-check on 356 inspections which every I-50 must pass.

OCTOBER 1953

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-sixth year of publication

VOL. 111 NO. 4

ELECTRICAL WEST

George C. Tenney, Editor
W. A. Cyr, Associate Editor — Walter C. Heston, Engineering Editor
Peggy Boyer, Associate Editor — John Cootz, Typography

Next Month

Leading articles for the November issue will all be devoted to distribution. Subjects will range from philosophy to practice. One of the most important articles will deal with distribution planning. This will present a new simple unit system for future planning.

There will be an open letter to distribution engineers from one of the editors. This will stimulate thinking on a phase of distribution that seems to have been overlooked.

An article on preformed grips for dead-ends and guys will bring out advantages and costs.

Economics of secondary capacitors will be the subject of one article.

Considerations entering into the choice of a type of field-spun secondary aluminum cable adopted by one utility are enlightening.

Other subjects are: how one utility substantially reduced losses, use of precast manholes to reduce construction costs, an all-glass-front downtown substation, how a small-town distribution system was completely redesigned.

An article by an electrical contractor will set forth why contractors feel that utilities should contract more of their line work.

There are new developments to report in the sales and contractors' news letters for November.

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It is easy to construct a solid, well-aligned installation with L-M Fibre Conduit and "Easy-To-Use" accessories. The illustration shows use of L-M base and intermediate spacers, to assure firm, even spacing.

L-M Spacer units. Top, Intermediate Spacer, with inset showing how spacers are locked together to make 3- or 4-way combinations. Center, L-M's Base Spacer, with 3" base to give a rigid, firm foundation. Center groove is for grounding wire. Bottom: Bend Spacer Bar, used vertically or horizontally to maintain alignment at bends. 1½" square, 20" long.

L-M's Completely Engineered System Makes Fibre Conduit So Easy To Use

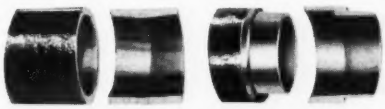
L-M Fibre Conduit has many advantages for underground installations. It's proof against corrosion, vermin, leakage; joints are easily made, without cement, and are watertight. L-M Fibre Conduit's smooth inner bore makes cable easier to pull, with minimum abrasion. You'll find it can be laid faster than many other types of duct.

In addition, L-M offers a completely engineered system for conduit installations. This includes L-M spacers, to keep installations rigid and evenly aligned; a variety of bends and fittings, including L-M's 5° couplings and 5° multi-use bend sections; the new L-M tapering tool and fibre conduit vise. Some of the L-M engineered fibre conduit fittings are shown here.

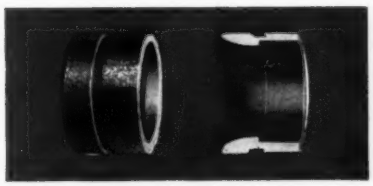
Get Complete Information

You should have the whole story. Ask the L-M Field Engineer for a copy of the 12-point plan folder, which shows how easy it is to use the L-M system; also for our underground construction handbook and Bulletin UG-1A, which gives complete specifications. Or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

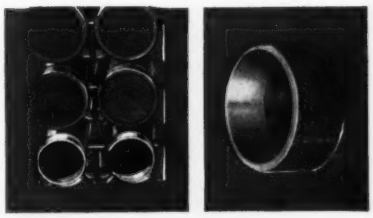
L-M provides a variety of bends. At left, 45° and 90° bends. Right, L-M's S-Bend, which provides a 20" offset without restricting drawing of cable. Special bends available on order.



The 5° angle coupling at left provides for long radius turns, and offsets. The multi-use bend section gives a 5° angle and the sections can be joined without nipples for special radius turns, crossovers, etc.

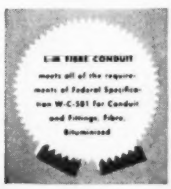


L-M's Bell Ends for use at conduit terminals in manholes provide a smoothly rounded opening that will not cut or mar the cable sheath.



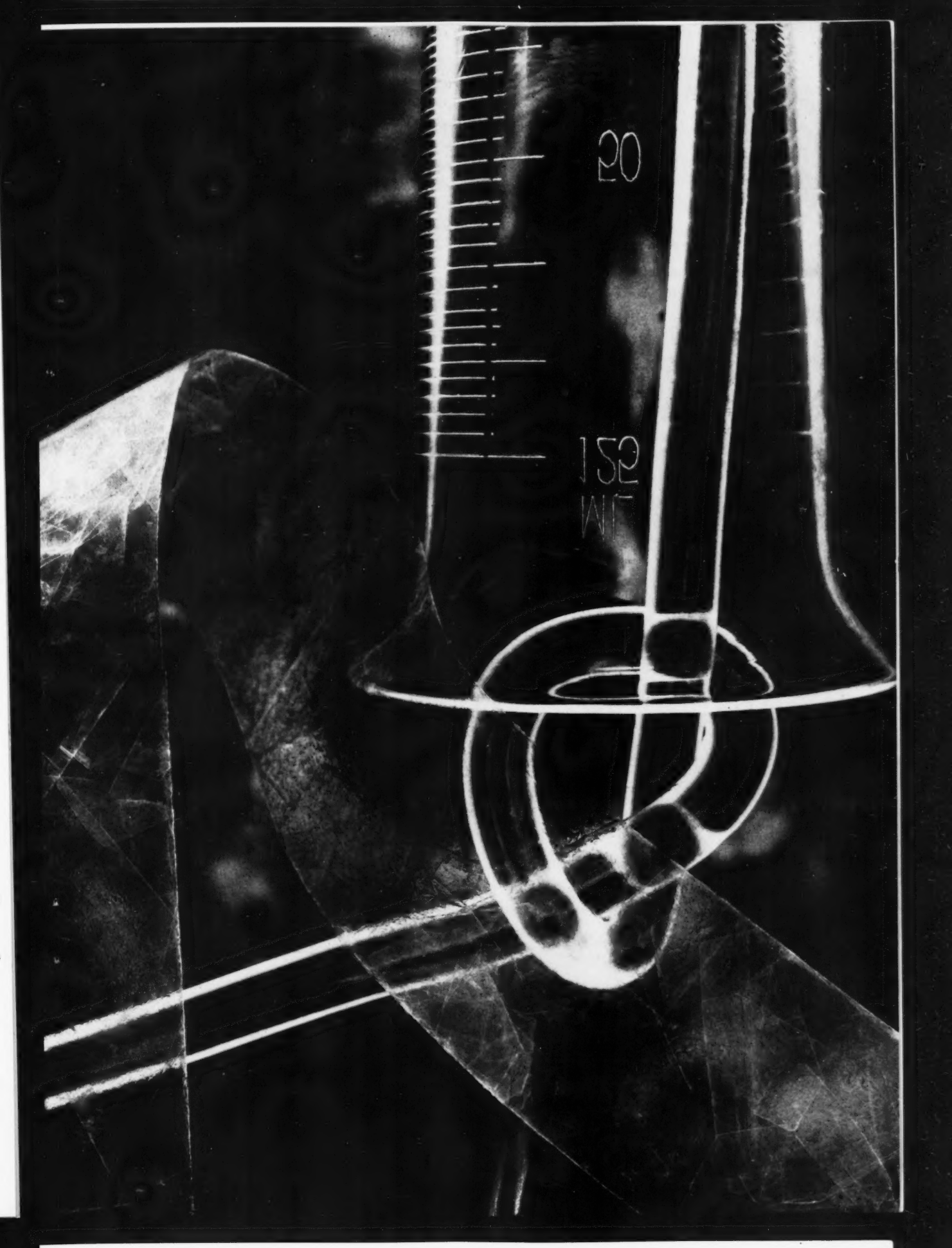
L-M's Fibre Caps are accurately tapered to provide a watertight, vermin-proof seal for fibre conduit lines prior to drawing cable. Easy to remove for re-use.

141


L-M FIBRE CONDUIT
meets all of the requirements of Federal Specification W-C-581 for Conduit and Fittings, Fibre, Bituminized

LINE MATERIAL

Fibre Conduit


20

Helping the industry meet its growing loads

Thermalastic... insulation with a memory*

Thermalastic insulation is the latest magic of industrial chemistry to achieve practical application in large motors and generators. Heat it . . . cool it . . . cycle it again, Thermalastic remembers the copper to which it is applied and stays with it. Stretching does not affect its properties and it will always return exactly to its original shape.

The scope of this development challenges the imagination. Thermalastic insulation offers the industry new freedom from shutdowns caused by insulation failure.

Most insulating materials in common use today are considered excellent. But imagine the inherent protection, the vastly improved reliability, in equipment having Thermalastic insulation . . . with its superior thermal stability, outstanding moisture resistance and inertness to chemical contamination and dirt! The high voltage endurance of Thermalastic increases "time to failure" many hundred fold.

The basic materials in Thermalastic insulation are well known, their characteristics proved. The contribution of chemistry has been the development of a synthetic resin that contains the same elements as natural resin with an important molecular change. That, plus a new application technique, produces distinctive qualities that utilize fully the high insulating value of large mica flakes, and maintains them throughout the endless heat cycling that windings must endure. Thermalastic insulation will always hug its copper. It will never migrate or become brittle with age.

Evolved in the minds of engineers, developed in the laboratory, made practical on the production line, Thermalastic insulation is an outstanding example of the progress that Westinghouse offers to help you meet America's power needs.

*Trade-Mark

J-97176

YOU CAN BE SURE... IF IT'S

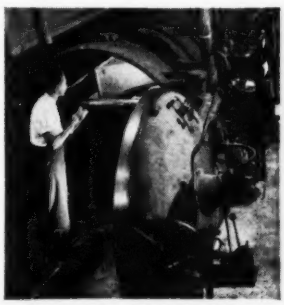
Westinghouse

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

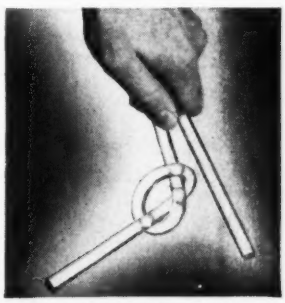
Thermalastic insulation

A chemist's skill at synthesizing, plus an application technique, adds wonderful new qualities to time-proved insulating materials.

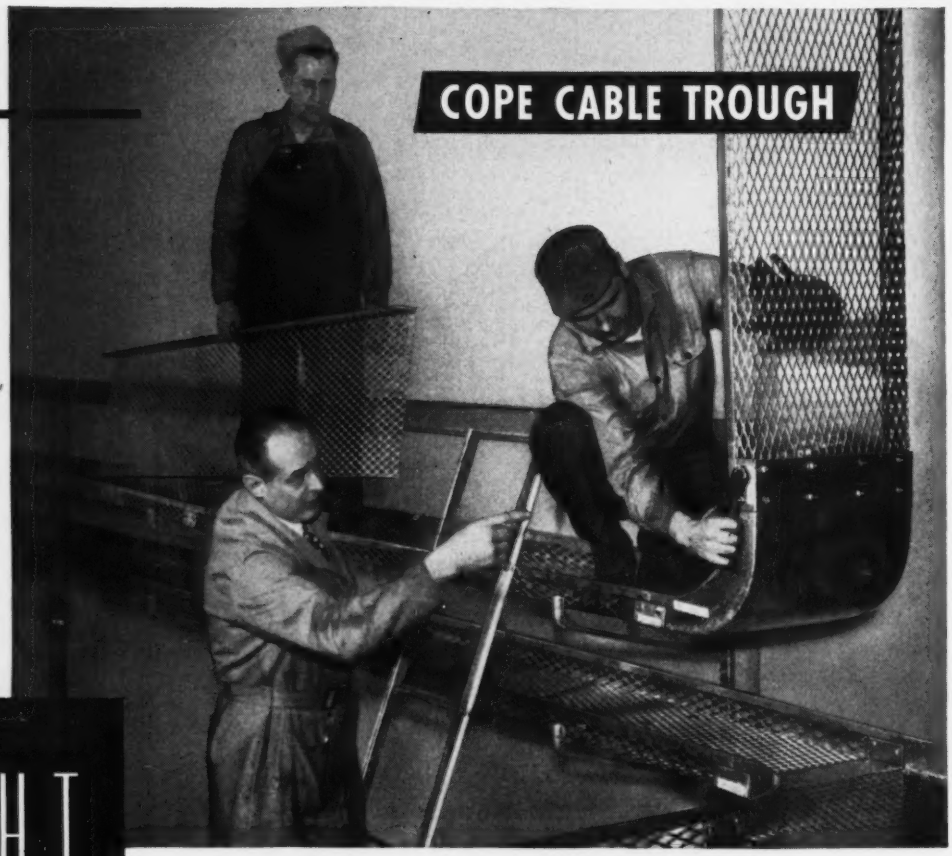
Large mica flakes are built into a resilient, flexible tape that can be wound in smooth layers, providing the highest insulating qualities known.



The synthesized resin, having low viscosity, can be made to penetrate the mica completely, leaving no voids between layers, or between mica and copper. Thermosetting, it creates no voids, will not melt.



Infinitely elastic, chemically inert, the resin will hold the mica tight to its copper regardless of heat cycling or overload. Unaffected by moisture, it will never become brittle with age.



LIGHT

. . . . BUT STRONG!

Here is a graphic demonstration of three of the many features of Cope Cable Trough. Note the ease with which a section is held by one hand. Observe, too, how the trough supports the two workmen as well as the ladder on which the foreman is standing. Its great Strength combined with Lightness make for easier, faster installation and permanent alignment even when filled with cable. There's no sagging to mar the general appearance or to invite wear of the cable.

Cope Cable Trough is of standardized construction for greatest economy yet versatile enough to meet any individual requirement. As the photograph shows, standard Cope fittings allow for turns, branches and changes in elevation.

Many successful installations in leading utilities and industrial plants are proof of its advantages. Many of these installations are on the West Coast. Write any of the representatives listed below for full information.

T. J. Cope INC.

You know Cope by these products

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Phone CUMBERLAND 3-4183

GEORGE E. HONN CO.
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SAN FRANCISCO 11, CALIF.
Phone SUTTER 1-7352

J. E. EDSTROM
319 S.W. WASHINGTON ST.
PORTLAND 4, ORE.
Phone BR 1702

FRED W. CARLSON
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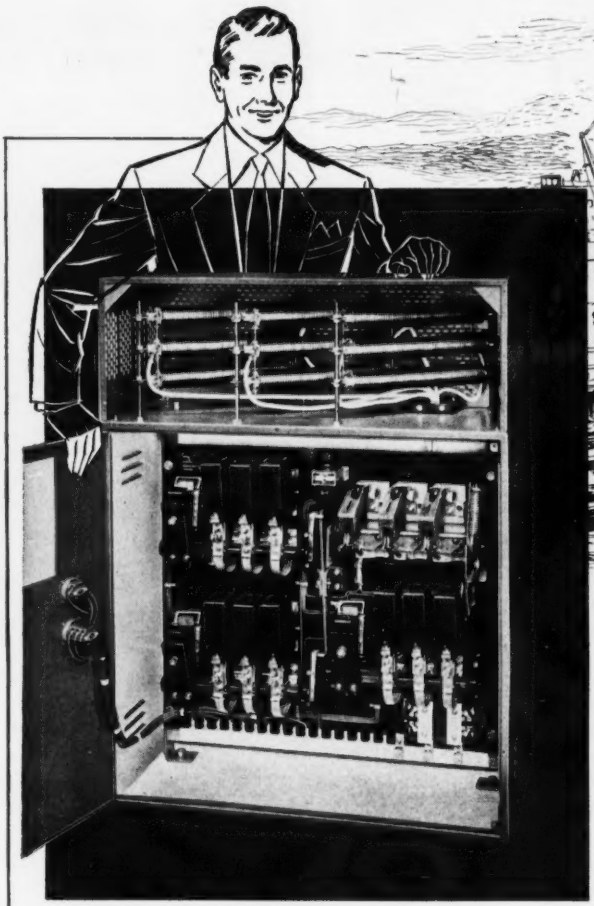
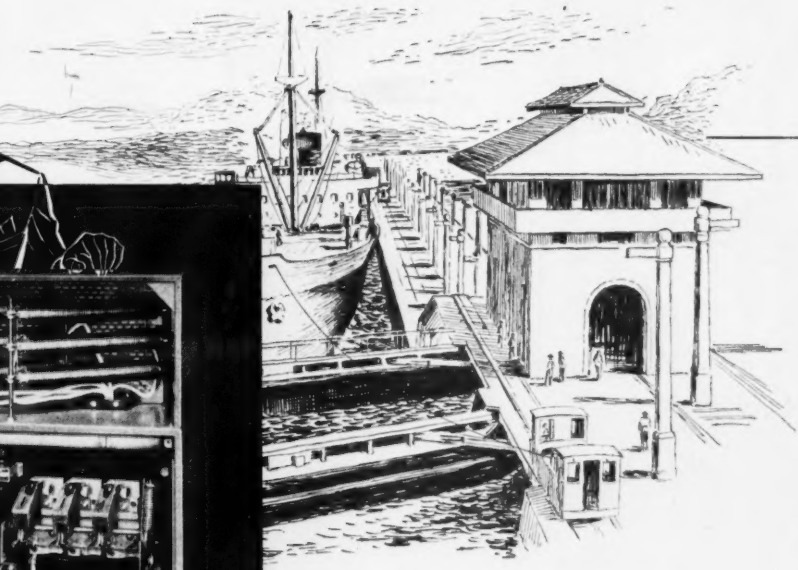
Phone ELIOT 6630

IT'S FEDERAL NOARK® MOTOR CONTROLS FOR THE PANAMA CANAL





ABOVE: View of the upper pair of the Miraflores locks and one of the control towers from which the new Federal Noark motor controls are operated.

AT LEFT: Interior view of one of the eight types of motor controls built for the canal project.

THE PANAMA CANAL is now undergoing an extensive modernization program. One phase requires new electric motor controls for the locks...and Federal Noark devices are being installed. These controls will assure the safe, efficient motor starting required for rapid and continuous canal service.

Special processes in the manufacture of these 398 motor controls were necessitated by the specifications. Wire insulation, for instance, and other parts likely to deteriorate under tropical conditions had to be protected against "attack by insects, especially cockroaches and termites," and made fungus-proof with suitable shellac. To accomplish this, Federal engineers treated each part separately before assembly.

Whether your control problems are simple or as complex as those for the Panama Canal, call in Federal Noark for the right solution.

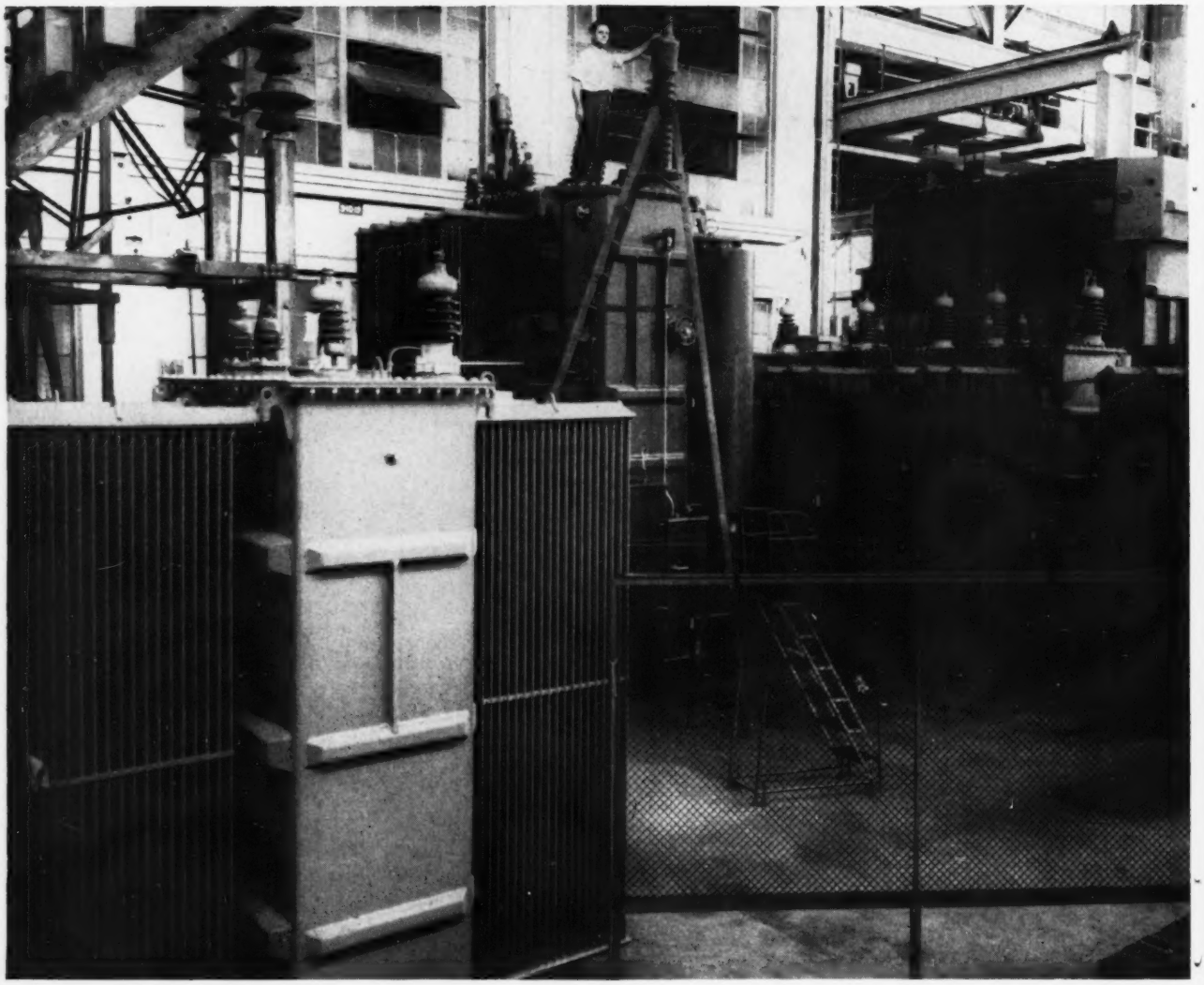
Write Federal Electric Products Company, 50 Paris Street, Newark 5, N. J.

Plants at Newark, N. J.; Long Island City, N. Y.; Hartford, Conn.; Cleveland, Ohio; Gary, Ind.; St. Louis, Mo.; Dallas County, Texas; Los Angeles, Calif.; San Francisco, Calif.; Santa Clara, Calif. Affiliated plant, Toronto, Canada.

Federal Noark products: Stab-lok Circuit Breakers, Motor Controls, Safety Switches, Service Equipment, Industrial Circuit Breakers, Panelboards, Switchboards, Control Centers, Bus Duct — **Pacific Electric Manufacturing Corporation products:** High voltage circuit breakers and power switches ★ Sales offices in principal cities.

FEDERAL NOARK®

Wagner POWER



A typical group of Wagner Transformers nearing completion at the Wagner plant. Wagner has all the facilities necessary to manufacture power transformers up to 60,000 kva. Bulletins TU-180 and TU-181 give information on the complete Wagner Transformer line. Write for your copies.

® Wagner Electric Corporation EST. WE 1891

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6381 Plymouth Ave. • St. Louis 14, Mo., U. S. A.

ELECTRIC MOTORS • TRANSFORMERS • INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS — AIR AND HYDRAULIC

BRANCHES IN 32 PRINCIPAL CITIES

T53-12

TRANSFORMERS

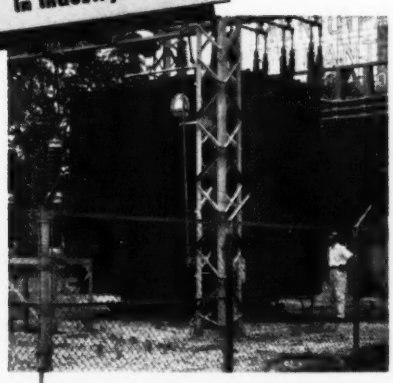
built to provide utmost reliability and service continuity . . .

Wagner has been building power transformers for more than sixty years. The knowledge gained and the facilities acquired in all those years make the building of fine power transformers part of the day's work at Wagner.

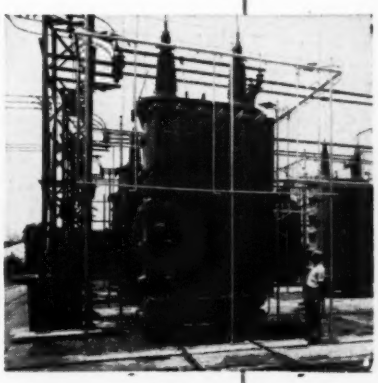
Years of engineering "know-how" —Wagner's insistence on the use of only the highest quality materials—carefully controlled production methods—rigid inspections and tests all combine to assure users power transformers that will provide utmost reliability and service continuity.

That's why you will find Wagner Power Transformers the first choice of a great many industrial and power companies. That's why it will pay you to consult Wagner on your next power transformer installation. Wagner maintains thirty-two branch offices, located in principal cities, for quick convenient engineering service and consultation.

Wagner
TRANSFORMERS
...the choice of leaders in industry



This Wagner Power Transformer, rated 20,000 / 25,000 / 33,000 kva, is installed in a midwest power plant.



One of ten oil-filled Wagner Power Transformers, each rated 5000 kva self-cooled, 6667 kva forced air-cooled, at a substation in New Orleans.

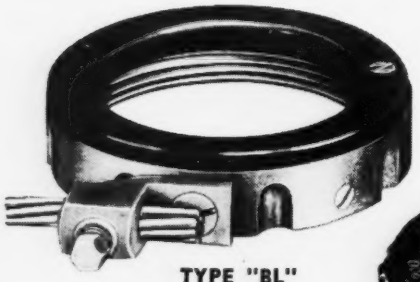
THERE'S AN

O.Z. BUSHING

FOR EVERY JOB

TYPE "B"

Strongest insulating bushing available! Exclusive design permanently locks insulation into casting.



TYPE "BL"

Same as proven Type "B" with lug for quick, positive ground connections. Set screw in casting facilitates positioning.

Finest, high-strength, all-Bakelite insulating bushing. A top quality bushing—competitively priced!

TYPE "A"

All-Bakelite bushing with male thread for insulation of exposed cables passing through holes in metal boxes or troughs.

TYPE "BB"

Over 35 years of specialized experience in the design and manufacture of conduit fittings is behind the complete line of O.Z. insulating bushings. Whatever your insulating bushing problem, you can be sure there is an O.Z. design to fit your application perfectly. Buy O.Z. bushings from your local electrical distributor.

O.Z. ELECTRICAL MANUFACTURING CO., INC.

262 BOND ST. • BROOKLYN 2, N. Y.

CAST IRON BOXES • SOLDERLESS CONNECTORS
CABLE TERMINATORS • GROUNDING DEVICES
POWER CONNECTORS • CONDUIT FITTINGS

Representatives in all principal cities

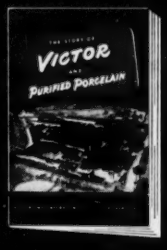
VICTOR *PURIFIED PORCELAIN* SUSPENSIONS
RUN THE GAUNTLET TO GIVE YOU GREATER SERVICE

Victor No. 924 (25,000 lb.) Suspensions undergoing high frequency and 60-cycle flashover tests on Victor-designed continuous testing machine.

VICTOR NO. 924
(25,000 lb.)
SUSPENSION

Every Victor Suspension Insulator has to "run the gauntlet" through the flashover testing machine illustrated here. And every one must stand up under both high-frequency and 60-cycle flashover for a period of more than three minutes before being eligible for shipment. This stringent, individual testing, coupled with the greater toughness, uniformity and resistance to impact of Victor *Purified Porcelain* gives greatest possible protection for your lines! More reasons why Victor is the power man's best buy! For full data on Victor Suspensions, write for Bulletin No. 4.

FREE BOOKLET gives you the full story on how Victor insulators are made—how and why *Purified Porcelain* was developed. Write us for your copy.



Specify

VICTOR INSULATORS, INC., VICTOR, N. Y.

Low and High Voltage Pintypes • Suspensions • Guy Strains • Spools • Switch and Bus Insulators • Custom Designed Porcelain

NUMBER FOUR OF A SERIES

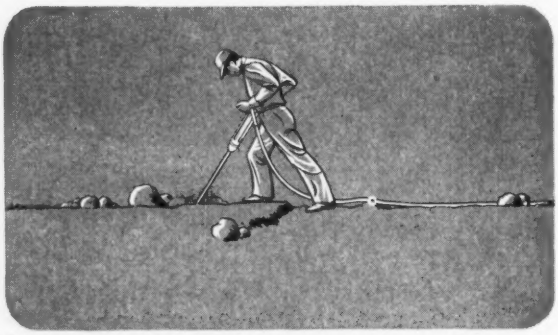
TIPS FOR BETTER ANCHORING...

How to install Anchors in Rocky Areas

ROCK ANCHORS are used where bed rock lies close to the earth surface. The Chance Expanding Rock Anchor installs in a small drilled hole and expands to wedge against the sides of the hole. Load strain increases this wedging action. This anchor requires no concrete or lead grouting—cuts installation costs. Note simple procedure shown at right.

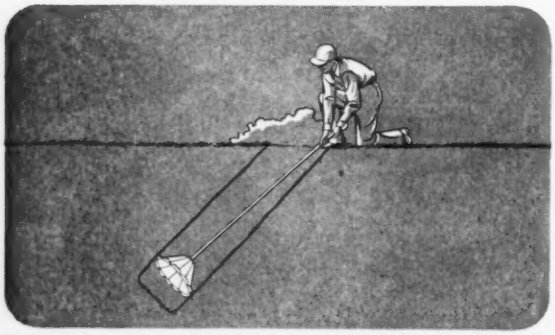
CONE ANCHORS are used in rocky earth formations where moisture content is low. Chance Steel Cone Anchors have eight flat faces that wedge against the tamped rock fill. A serrated flaring base supports the rock at the bottom of the hole to increase the effectiveness of this wedge. A nut retainer aids installation.

TO ANCHOR IN SOLID ROCK

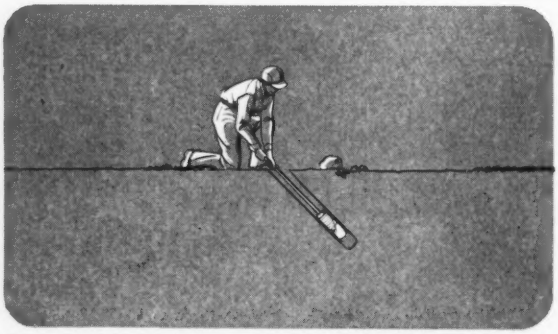


1. Drill the hole, in line with the guy, using a power driver or hand-operated rock drill.

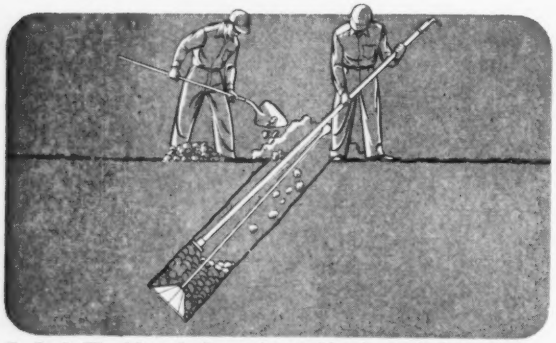
TO ANCHOR IN ROCKY SOIL



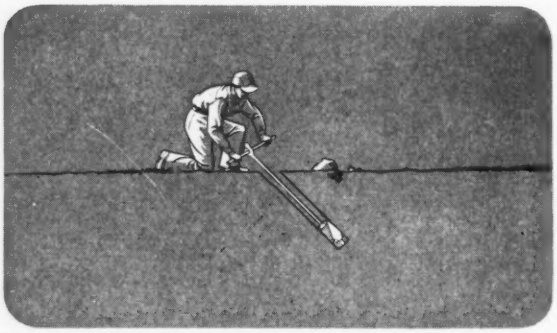
1. Drill hole, in line with guy, by hand or machine. Hole should be same diameter as the anchor for best wedging effect of tamped rock. Lower anchor into hole.



2. Drop anchor to bottom of hole. Hole diameter should be ⅛" to ¼" larger than the unexpanded anchor.



2. Back fill with rock. Tamp thoroughly. As strain is applied the rock wedges between cone and wall of hole to lock cone securely.



3. Expand the anchor by inserting a steel bar or section of pipe through Thimbleye and turning. Tighten the guy—and you're through.

You GUY WITH CONFIDENCE when you BUY FROM CHANCE

Reprints of this advertisement are yours for the asking. Request Form 54, Special Anchors. Write A. B. Chance Company, Centralia, Mo.

C53-11

ABC INDUSTRIES

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CENTRALIA, MISSOURI
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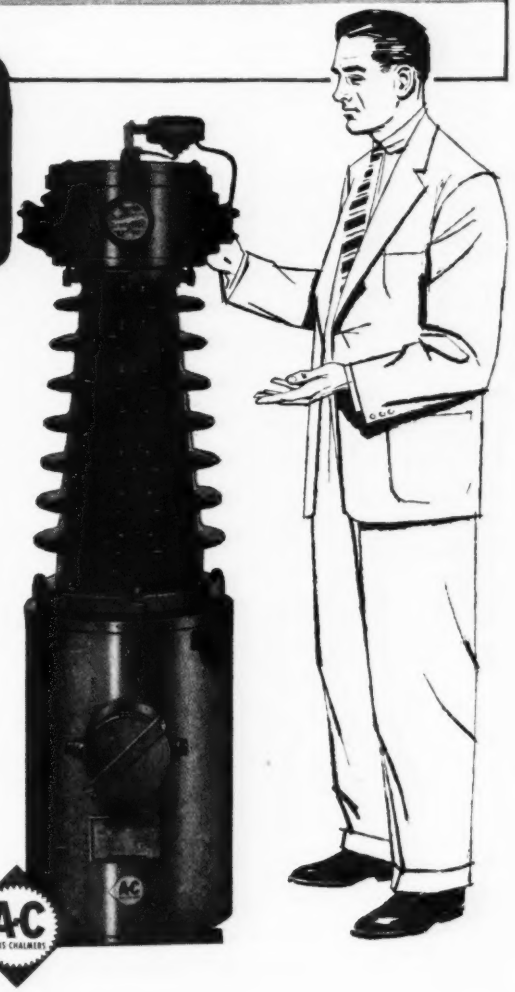
ANCHORS • GUYING FIXTURES • LINE CONSTRUCTION TOOLS • CONDUCTOR CLAMPS
GROUNDING EQUIPMENT • HOT LINE TOOLS • HIGH VOLTAGE SWITCHES • CUTOUTS

New Outdoor Current Transformer IS LIGHTER, TAKES LESS SPACE

COMPARE THESE FIGURES

KV	DESIGN	FLOOR SPACE	HEIGHT	GAL. OIL	WEIGHT (lbs.)
25	New Type SCW	14" x 19"	42"	9	230
	Previous Type	22" x 22"	33"	15	490
34.5	New Type SCW	14" x 19"	45"	9½	230
	Previous Type	22" x 22"	33"	15	490
46	New Type SCW	16" x 23"	55"	16	475
	Previous Type	23" x 23"	40½"	18½	500
69	New Type SCW	16" x 23"	61"	18	525
	Previous Type	28½" x 28½"	46½"	35	1000

ALLIS-CHALMERS
INSTRUMENT TRANSFORMERS



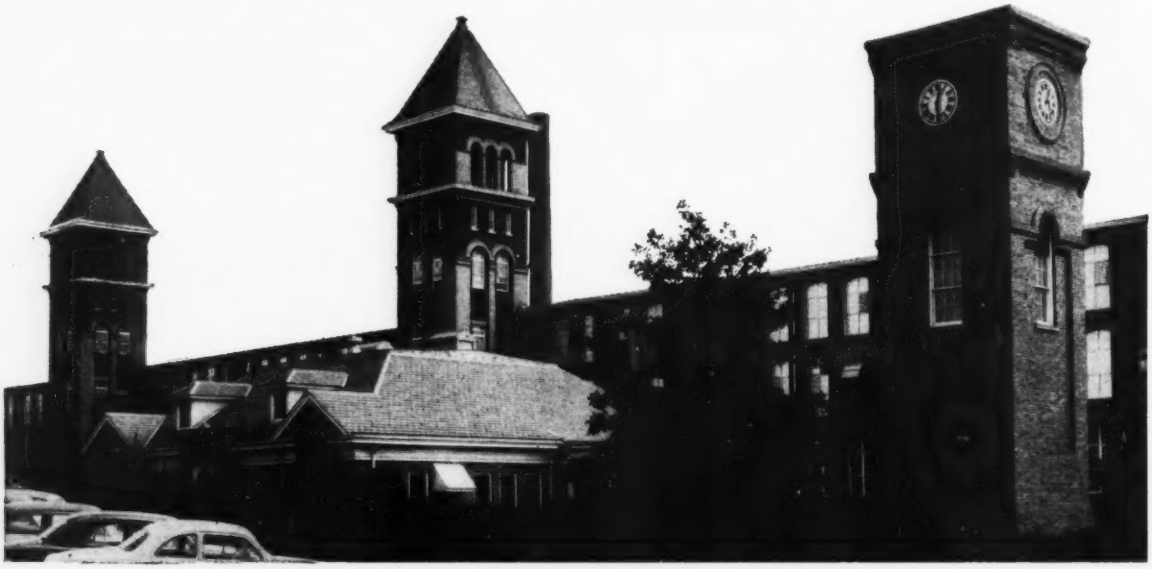
Here is a completely new line of current transformers for outdoor use on power circuits 69 kv and below. They bring you many new design features that result in excellent performance, high thermal and mechanical strength, plus mechanical advantages that simplify installation.

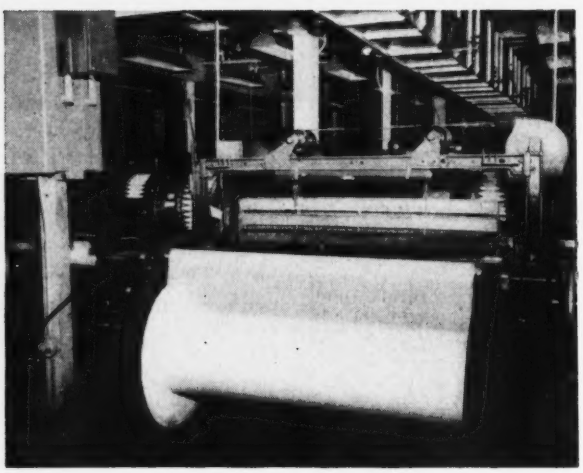
Most important, their ruggedness has been proved by exhaustive tests. Temperature rise at normal current is low, allowing ample overcurrent in emergencies. The transformers are rated 65 times normal primary current under short circuit conditions. Corona-free design extends insulation life.

For the complete story get your copy of the paper "Progress in Instrument Transformer Design" by writing Allis-Chalmers, Milwaukee 1, Wisconsin. A-4110

ALLIS-CHALMERS

For long life at 100°F. ambient—
world's largest weaving mill





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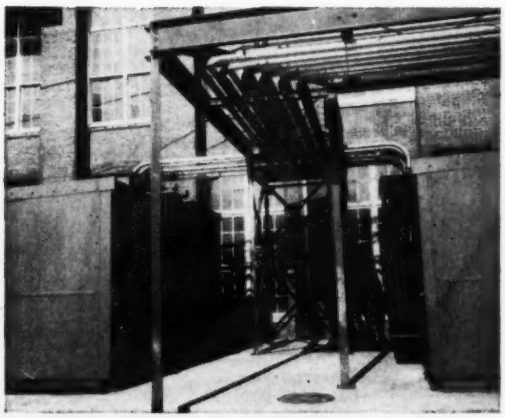
USS
TRADE MARKS
AMERICAN ELECTRICAL WIRE AND CABLE
UNITED STATES STEEL

A STANDARD CABLE FOR

▼ asbestos wire and cable ▼ shovel & dredge cable
▼ paper & varnished cambric cable
▼ aerial, underground & submarine cable

U·S·S AMERICAN ELECTRICAL

chooses U·S·S American Varnished Cambric Cable



● At Lancaster, S. C., Springs Cotton Mills operates the largest weaving mill in the world under one roof. Some time ago, they completely revamped the electrical layout, and changed from a single bus bar source to a system of 11 separate sub-stations. Now, an electrical failure will affect only *one* part of the mill.

To further guard against failure, 500 MCM American Varnished Cambric Cable is used for feeders from the sub-stations to various parts of the mill. There's no better cable for a job like this.

American Varnished Cambric Cable is flexible and easy to handle. There are no difficult terminal problems because potheads are not required as with paper cable. Current rating is high, even under adverse ambient temperature and humidity conditions. Service life is great, because of the special American heat-resisting varnished cambric tapes. Here is the perfect insulation for industrial plant use.

Whenever you have a tough insulation problem, be sure to get in touch with the cable engineers at American Steel & Wire. They'll make sure that you get the most for your money —no matter what kind of a cable problem you have.

AMERICAN STEEL & WIRE DIVISION
UNITED STATES STEEL CORPORATION
GENERAL OFFICES: CLEVELAND, OHIO

COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
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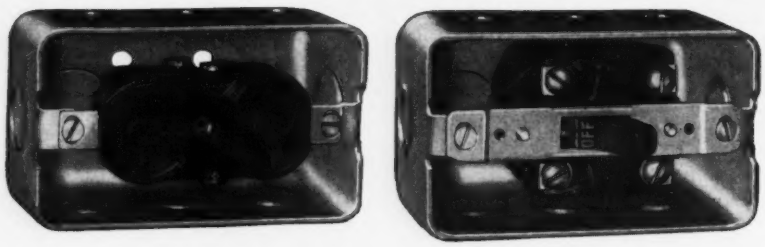
☐ Please give me more information about American Varnished Cambric Cable.
☐ I'd like to talk to your representative.

Name .....
Firm .....
Address .....
City ..... State.....

UNITED STATES STEEL

EXTRA SPACE in these *New* UTILITY BOXES



Permits the Use of Heavy Duty Switches and Receptacles and Allows for More Convenient Wiring

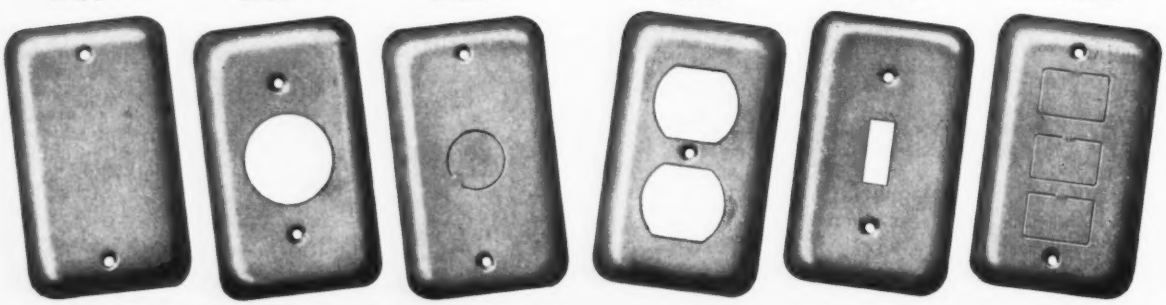
No. 68361 is 4-1/8" long, 2-1/2" wide and 1-15/16" deep. It can be furnished with either 1/2" or 3/4" knockouts. Knockout arrangement is three in each side, one in each end and three in the bottom. This box has a wiring capacity of 17-1/2 cubic inches, which permits the use of heavy duty switches and receptacles, allowing ample space for easy wiring. Any KO can be used without interference when installing heavy duty devices.

No. 68371 is 4-1/8" long, 2-1/2" wide and 2-3/16" deep. It can be furnished with either 1/2" or 3/4" knockouts. Knockout arrangement is three in each side, one in each end and three in the bottom. This box has a wiring capacity of 20 cubic inches, which permits the use of heavy duty switches and receptacles, allowing ample space for easy wiring, as will be noted in the above illustration of a four-pole, 30-amp. toggle switch.

For These Boxes There Are Six Over-lapping Covers To Conform to Their Increased Dimensions

No. 68-C-1 is a blank cover
No. 68-C-5 provides for single receptacle
No. 68-C-6 has 1/2-inch KO's
No. 68-C-7 is designed for duplex receptacle
No. 68-C-30 provides for toggle switch
No. 68-C-40 with 3-hole strap for "Despard" type wiring devices, has 3 square KO's so that one, two or three may be used in a single gang cover by removing KO's to be utilized

68-C-1 68-C-5 68-C-6 68-C-7 68-C-30 68-C-40



STEEL CITY ELECTRIC CO.
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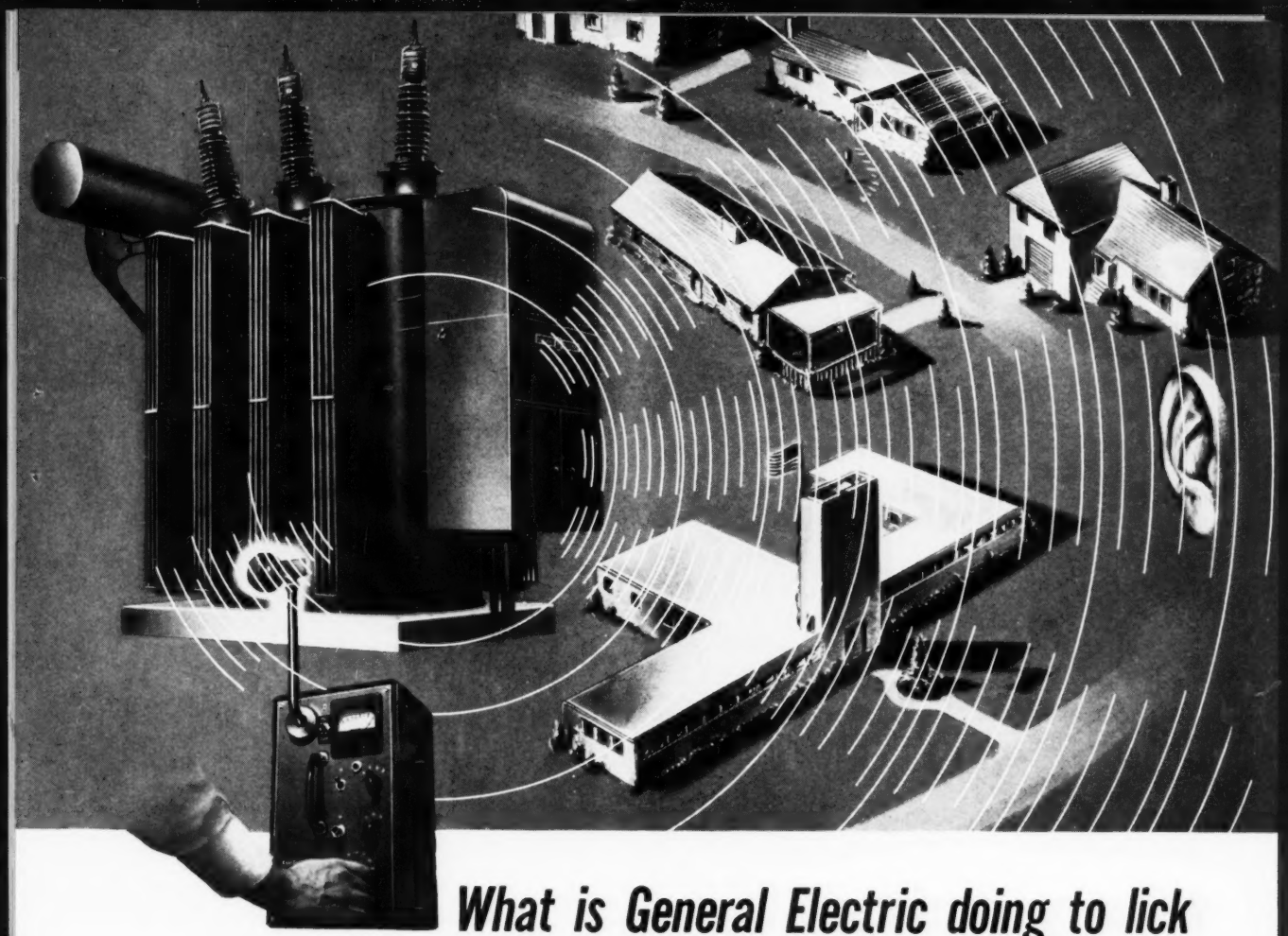
ELECTRICAL BOXES AND CONDUIT FITTINGS
KINDORF DEVICES FOR INSTALLING CONDUIT



What is General Electric doing to lick

THE TRANSFORMER NOISE PROBLEM?

Are lower noise levels possible without increasing size, weight or installed costs?

Increasing the capacity of existing stations and transforming power closer to the ultimate customer are realities of today's power system design.

Sensitivity to transformer noise has increased because of these trends which frequently dictate the installation of large power transformers in thickly populated areas. Also to hold the size and weight of large units to a minimum for ease of shipment and installation, the transformer designer is using materials more effectively. This, too, has aggravated the noise problem.

General Electric engineers, as one of the first steps in their research of transformer sound emission, analyzed the complicated acoustic circuit of a power transformer. This analysis pointed up 2 major sources of noise:

1. *The core,* through magnetostriction in the core steel and in some ratings, vibrations in the joint regions.
2. *Accessories,* such as fans, coolers, and pumps.

Vibrational energy from these principal sources follows many paths through the transformer, driving various parts of the structure. Mechanical resonance further adds to the problem. At external surfaces, this vibrational energy is transformed into audible waves of acoustic energy and emitted to the air.

Field and laboratory studies have shown that to reduce the amount of acoustic energy emitted to the air involves:

1. Reducing the energy at the source.
2. Use of resilient mounts between core and tank base to minimize energy reaching the base which, in turn, drives the tank walls.
3. Use of barriers between core-and-coil structure and tank wall, to reduce energy transmission through the oil to the tank wall.
4. Use of flexible couplings and mounts for auxiliaries external to the tank.

To reduce aggravation of the noise problem by resonance requires: (1) determination of resonant modes of vibration of the core, tank and accessories; (2) development of techniques and instruments for measuring these resonant effects; (3) development of means for modifying resonant effects.

To evaluate our progress and to permit new and more accurate investigations, we are now building a new laboratory designed for making complete noise tests on the largest transformers presently contemplated.

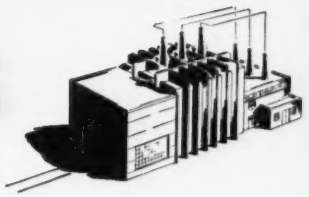
For further details, see next page.

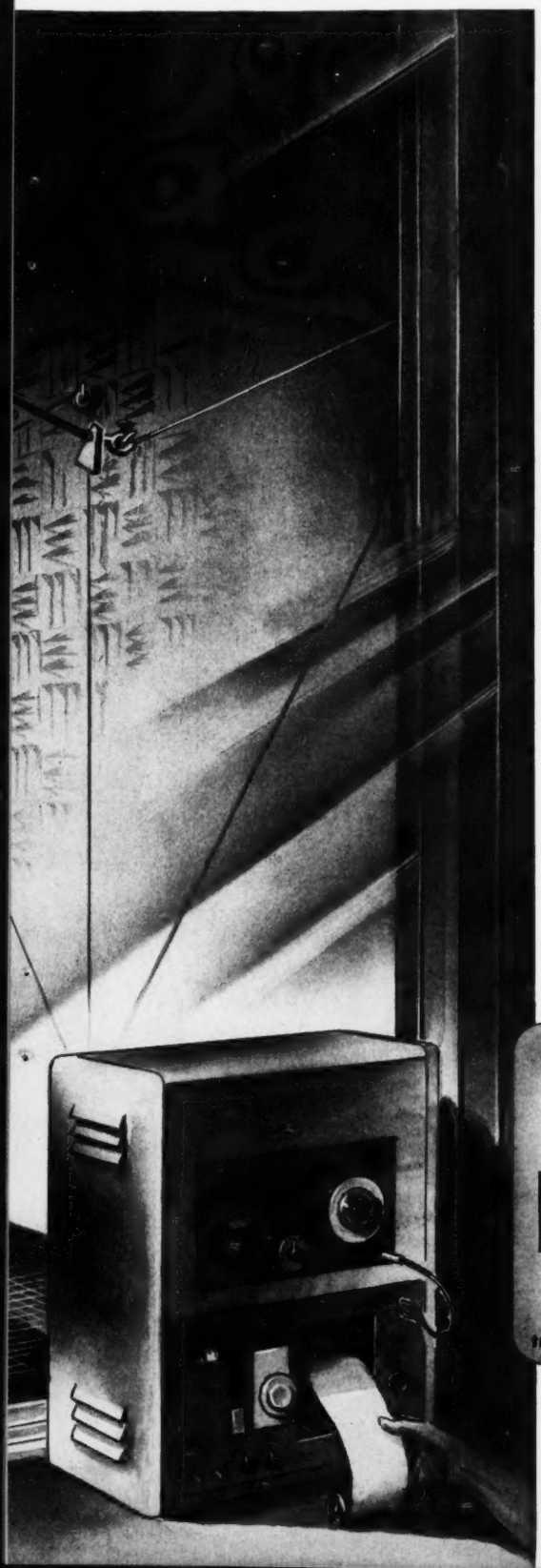
GENERAL ELECTRIC

New G-E anechoic sound laboratory..

..for quieter power transformers

at lower cost



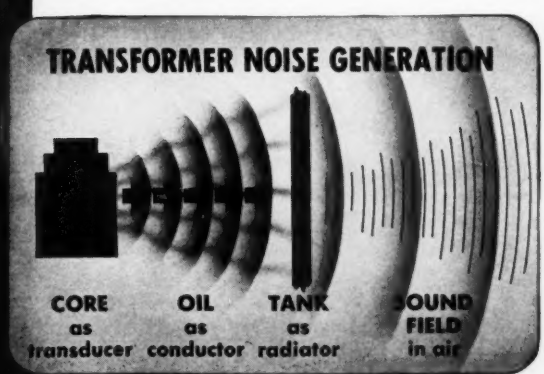


Accurate diagnosis of the causes of transformer noise is half the cure. Believing in this theory, General Electric is now building a new $1,500,000 anechoic sound laboratory at Pittsfield, Mass. This new lab, believed to be the largest in the world devoted exclusively to the study of sound, will be in operation by June, 1954. It will include advanced design measuring equipment that will make possible more complete studies of noise transmission and emission than have ever been possible before for large electric apparatus.

The new laboratory will pay its own way. Like G.E.'s High-voltage Laboratory which has helped so greatly toward solving lightning problems, it will be a cost reduction tool that must ultimately lead to quieter power transformers at lower cost.

A few of the features of this new lab are shown by the illustration at the left. Looking from the control room into the anechoic chamber through three thicknesses of glass, you can see the strange pattern formed by the Fiberglas wedges which eliminate echoes. A low ambient noise level and high absorption coefficient (.995) are obtained by double walls acoustically treated. Coming through the air-pressure-sealed doors (each 16 feet by 41 feet, motor-operated) is a 300,000-kva power transformer (the chamber will handle units up to 500,000 kva) on a specially built 28-foot transfer car. The small sketch at the top of page shows the exterior of the new building. The left section is the entry room, the large center section with the external stiffeners of reinforced concrete is the anechoic chamber and the right section contains the control and power supply rooms. The power is brought into the anechoic chamber through three high-voltage bushings in the roof.

The far greater test accuracy possible with the facilities contained in this new laboratory will permit General Electric to pin-point noise factors in power transformers to an extent never before possible. It is expected that new techniques, sure to result, will do much to lower noise levels without increasing costs to the user. General Electric Co., Schenectady 5, N. Y. 421-9

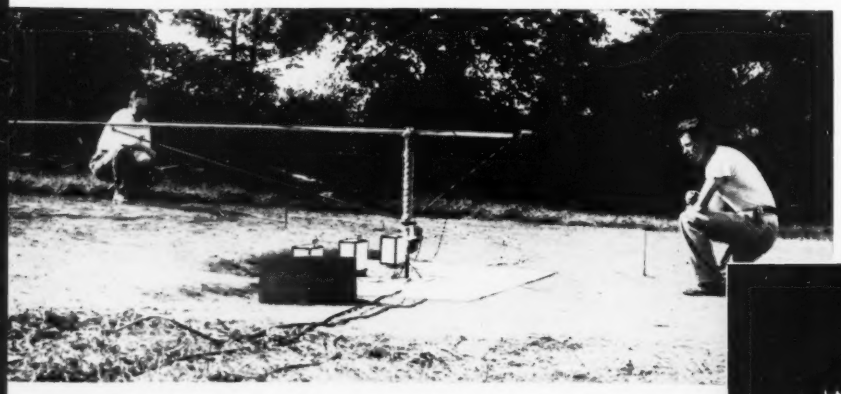


SIMPLIFIED SCHEMATIC of transformer noise generation shows how noise is transmitted to the outside air.

Progress in Power Transformers

GENERAL ELECTRIC

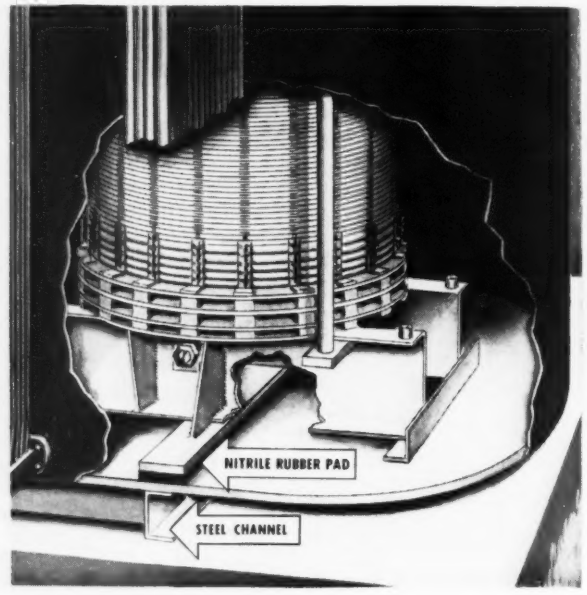
Scale models—low-noise-level building—new mounting arrangements; all further progress toward reduction of power transformer noise



FIELD STUDIES have been made on scale models of actual transformer installations as shown here. These models give accurate information on noise pattern being emitted, suggesting nature and configuration of practical external sound barriers.

LOW-NOISE-LEVEL BUILDING is now used to test complete transformers as large as 5000 kva and to permit developmental studies.

DYNAMICALLY DESIGNED BASE with in-line mounts is a recent contribution to control of noise. A resilient pad is located between lowest core member and tank bottom. A specially designed steel channel is placed under the tank bottom, in direct line with this pad, to provide the stiffness needed for vibration isolation.



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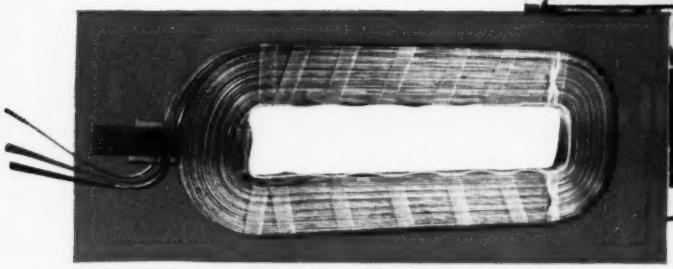
GENERAL ELECTRIC

NATVAR *in* NORWAY



This secondary coil shows the rugged construction used to insure proper operation under all service conditions. Natvar Varnished Fiberglas Tape and Sleeving are used to insulate and protect coils and leads from moisture and heat.

This UNITOR AC Arcwelder provides a welding current of 600 amperes at 40 volts load voltage on a 50% duty cycle. Heat range can be controlled either at the unit or from the operator's stand, from maximum down to 100 amperes at 25 volts. The unit can be moved close to the job so that long ground and electrode cables are not required.

UNITOR A. S., Oslo, Norway, manufactures a complete line of AC Arcwelders which can be easily moved from job to job. Since service conditions vary widely, these units are designed and built to operate in spite of severe moisture, corrosion, heat, and vibration.

Transformer coils and leads are insulated and protected with Natvar Varnished Fiberglas Tape and Sleeving because of its uniformly high performance under adverse conditions. Natvar agent and distributor for Norway is C. Bagges Asbestkompani A.S., Radhusgt 6, Oslo.

If you need insulating materials with good physical and electrical properties, and exceptional uniformity, it will pay you to get in touch with your distributor, or with us direct.

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- Slot cell combinations, Aboglas®
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- Styroflex® flexible polystyrene tape
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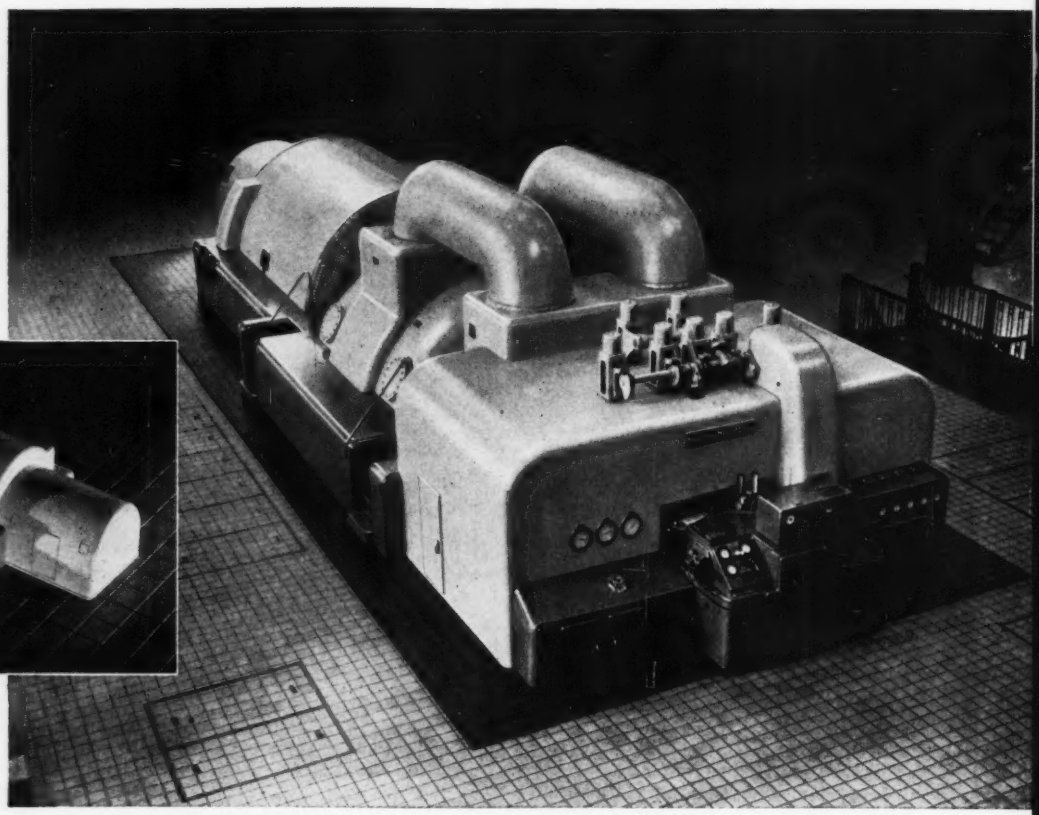
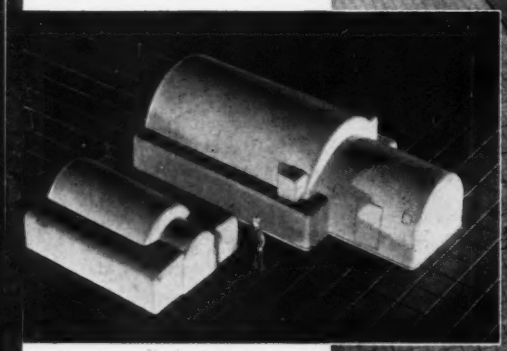
Major Developments



At right: World's first *supercharged* hydrogen-cooled turbine generator — with direct rotor conductor cooling — installed at the Wisconsin Power and Light Company's Edgewater Station in 1951.



Above: Relative size of fully *supercharged* and standard hydrogen-cooled generators of the same kw rating.

Operation-Proved Supercharged Generator

Availability — 100%. On-the-line service factor — 97.41%. That summarizes the performance of the world's first *supercharged* hydrogen-cooled turbine-generator unit during its first full calendar year of operation.

By cutting generator size, *supercharged* direct conductor cooling permits smaller plant size, less expensive foundations, and smaller breakers and bus structures; minimizes mechanical design limitations; raises possible maximum ratings, and reduces field assembly problems.

That these advantages are obtainable has been proved in operation.

As a result, Allis-Chalmers is now building a completely *supercharged* generator resulting in the size reduction shown in the small illustration at left above.

A-4089

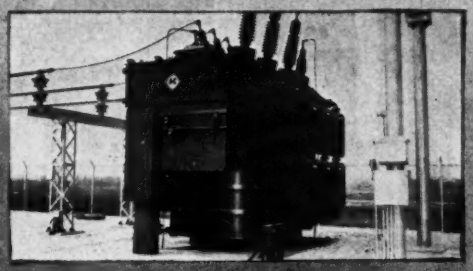
Equipment for Power: Water Conditioning equipment, chemicals and service . . . Steam and Hydraulic Turbines . . . Generators . . . Condensers . . . Steam Jet Air Ejectors . . . Power Plant Pumps and Motors . . . Transformers . . . Circuit Breakers . . . Switchboards and Control . . . Switchgear . . . Unit Substations . . . Utilization equipment.

ALLIS-

in Power Equipment

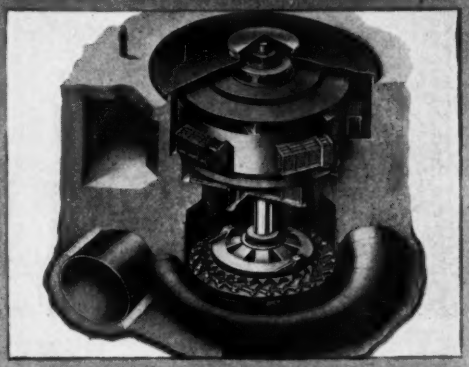
Corona-Free Power Transformers

Because Allis-Chalmers is building transformers rated 220,000 kva and others for 330,000-volt transmission, you can depend on A-C for units engineered to meet any application requirements. To check insulation aging, A-C transformers are designed to be corona-free even at highest test voltages. Without corona, transformers stay young, since repeated voltage stresses do not cause progressive deterioration of the insulation.



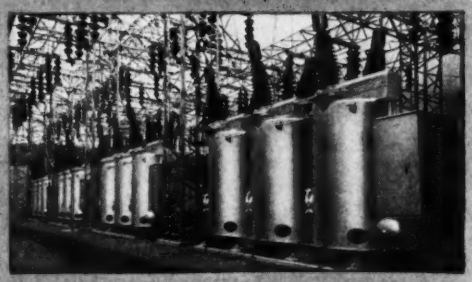
Reversible Pump-Turbine Units

Pioneered by Allis-Chalmers, reversible pump-turbines can solve some troublesome peak load problems. They do this by reducing the amount of equipment formerly needed for pumped storage operation; the single unit operates alternately as a turbine-generator and as a motor-driven pump. Five units are now in production, with turbine ratings ranging from 12,650 to 120,000 hp. The latter unit will combine the world's largest motor, with a rating of 102,000 hp, and the largest Francis turbine ever built.



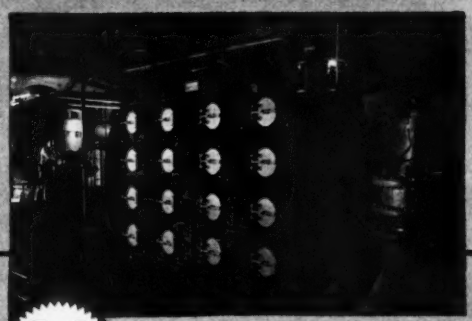
High Speed Circuit Breakers

As power systems grow, A-C circuit breakers keep pace with the new demands for size, speed and reliability. Mechanically trip-free pneumatic operators, originated by A-C in 1937, are in service on 20-20-20 cycle repetitive reclosing 3-cycle breakers. Now, hydraulic accumulator principles have been combined with proven pneumatic operation to produce the *Pneu-Draulic* operator and set new standards for large power circuit breaker speed and reliability.



Multi-Steam-Path Condensers

Allis-Chalmers is supplying six 100,000 sq ft surface condensers for the 2,200,000 kw of added private utility capacity being provided for AEC's Ohio diffusion plant. A-C multi-steam-path condensers have consistently helped to cut power costs. With 60 years of experience building over 13,000,000 sq ft of condenser capacity, A-C has the proven engineering and manufacturing facilities to build the largest condensers that might be required.



Pneu-Draulic is an Allis-Chalmers trademark.

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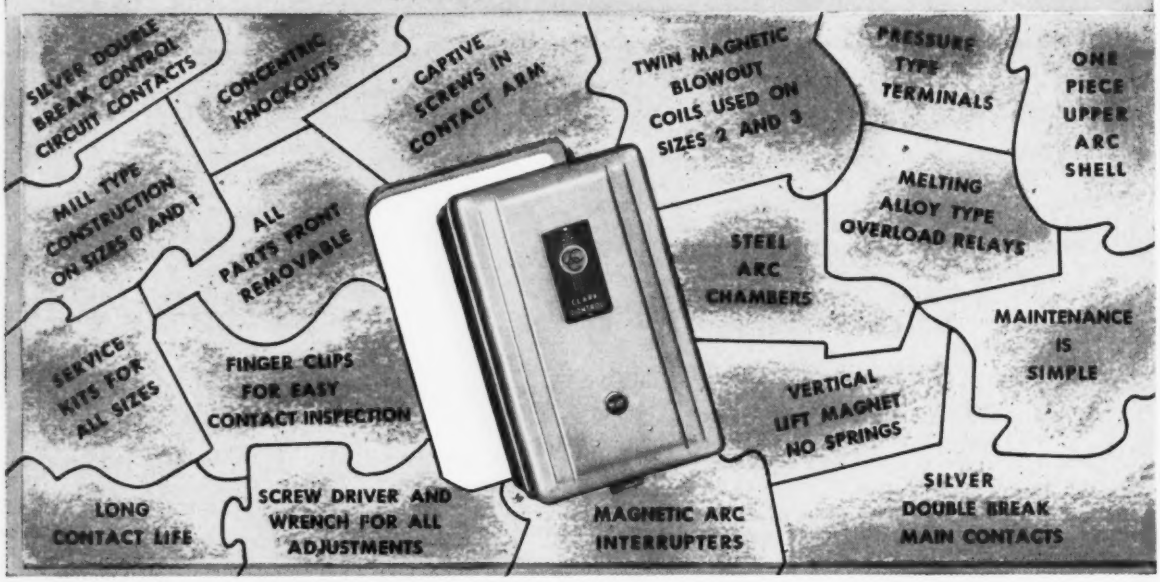
For more information, contact your nearby A-C representative, or write Allis-Chalmers, Milwaukee 1, Wis.

PERFECTED STARTERS


SILVER DOUBLE BREAK CONTROL CIRCUIT CONTACTS
CONCENTRIC KNOCKOUTS
CAPTIVE SCREWS IN CONTACT ARM
TWIN MAGNETIC BLOWOUT COILS USED ON SIZES 2 AND 3
PRESSURE TYPE TERMINALS
ONE PIECE UPPER ARC SHELL
MILL TYPE CONSTRUCTION ON SIZES 0 AND 1
ALL PARTS FRONT REMOVABLE
MELTING ALLOY TYPE OVERLOAD RELAYS
STEEL ARC CHAMBERS
MAINTENANCE IS SIMPLE
SERVICE KITS FOR ALL SIZES
FINGER CLIPS FOR EASY CONTACT INSPECTION
VERTICAL LIFT MAGNET NO SPRINGS
LONG CONTACT LIFE
SCREW DRIVER AND WRENCH FOR ALL ADJUSTMENTS
MAGNETIC ARC INTERRUPTERS
SILVER DOUBLE BREAK MAIN CONTACTS

EFFICIENTLY DESIGNED • ACCURATELY ENGINEERED • EXPERTLY BUILT

CLARK TYPE "CY" STARTERS

fit perfectly into your control puzzle

CLARK TYPE "CY" starters ingeniously combine for the first time in economical space, strong multi-turn magnetic blow-outs and twin double break contacts. These are enclosed in steel arc shields.

The coil sets up a magnetic field which extinguishes the arc by either lengthening or confining it.

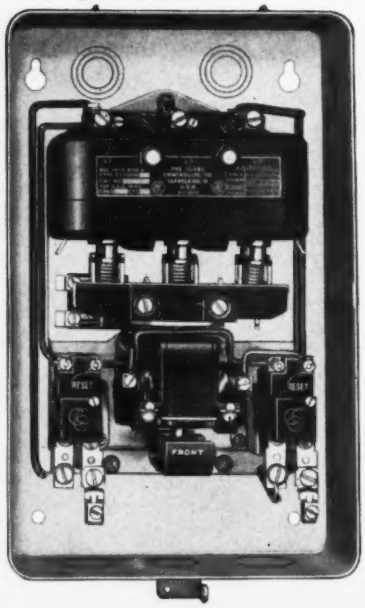
The arc is forced to rotate, and moves continually from hot to cold points on the contact faces.

The arc chamber is closed at the top—which means that the chances of phase to phase failure are minimized, as there is no accumulation of ionized gases between wiring terminals.

Type "CY" Sizes 2 and 3 embody this new principle of arc quenching—Sizes 0 and 1 are sturdily built for heavy duty operation.

Maintenance is easy. All parts are easy to examine, and all parts are front removable.

Service kits are available for adding single or double control circuit contacts.



For all AC Motor Starting . . . You ought to try **CLARK TYPE "CY"**

THE CLARK CONTROLLER CO.

ENGINEERED ELECTRICAL CONTROL • 1146 EAST 152ND STREET, CLEVELAND 10, OHIO

The Sunbeam Lighting Company again
EXPANDS its production facilities
(about 30,000 sq. feet) to meet
the growing demand for modern
scientifically designed
fluorescent
and incandescent
lighting fixtures for all
commercial and industrial purposes.
SUNBEAM LIGHTING COMPANY
777 East 14th Pl., Los Angeles 21, Calif.
SUNBEAM
visionaire
LIGHTING COMPANY

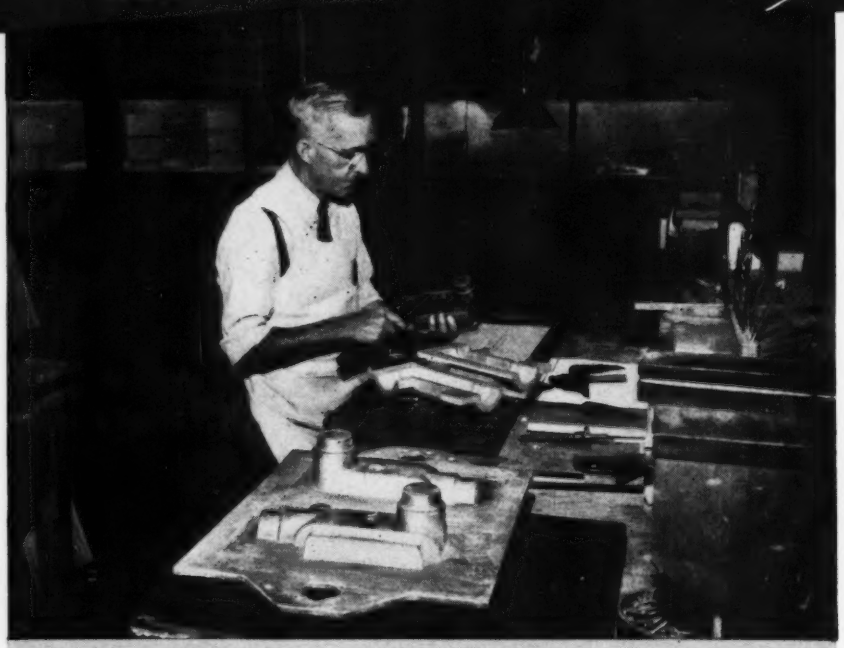
CROUSE-HINDS quality starts with the casting

Type FLB Explosion-Proof Circuit Breaker Condulet

Type ARE Plug Receptacle With Spring Door

Type GUAC Explosion-Proof Junction Condulet

Type LB Obround Condulet



1. A highly skilled patternmaker, with long years of experience in precision craftsmanship puts the finishing touches on an Obround CONDULET master pattern.

They're made right to serve you better.

Working from designs that have been carefully developed in the Engineering Dept., expert patternmakers make the master patterns. Perfect workmanship is a tradition in Crouse-Hinds Pattern Dept., where half the workers have records of from twenty-five to more than forty years of service.

Crouse-Hinds Iron Foundry is one of the largest and best equipped of its kind. It has the latest mechanical improvements to enable the skilled molders to produce the best possible castings. Most CONDULETS are made of Feraloy, Crouse-Hinds special alloy having the desirable characteristics of both cast steel and gray iron. It is strong, tough, holds its shape, is inherently corrosion resisting, homogeneous, and machines well, giving sharp, full threads.

To maintain Crouse-Hinds high standard of quality there is constant checking and testing. In the Foundry Control Laboratory, core and molding sands and oils are examined. Only the best are used. Continual temperature readings of molten Feraloy are taken, and test bars are made and tested for strength in the Mechanical Laboratory. The Chemical Laboratory makes daily analyses of the Feraloy output of the foundry.

Crouse-Hinds Non-Ferrous Foundry is equipped to turn out high quality castings of aluminum, bronze, and other metals.

When quality counts use CONDULETS. They're made right . . . to serve you better . . . and last longer.

CROUSE-HINDS COMPANY
Syracuse 1, N. Y.

OFFICES: Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas — Denver — Detroit — Houston — Indianapolis — Kansas City — Los Angeles — Milwaukee — Minneapolis — New Orleans — New York — Philadelphia — Pittsburgh — Portland, Ore. — San Francisco — Seattle — St. Louis — Tulsa — Washington.
RESIDENT REPRESENTATIVES: Albany — Atlanta — Baltimore — Charlotte — Corpus Christi — Richmond, Va. — Shreveport
Crouse-Hinds Company of Canada, Ltd., Toronto, Ont.

CONDULETS • TRAFFIC SIGNALS •

. . . and goes thru every step

That's why CONDULETS last longer*

2. Expert molders operate the molding machines in Crouse-Hinds modern foundry. Sand hoppers are shown at top.

3. Molten Feraloy is poured into the molds from a distributing ladle in Crouse-Hinds mechanized foundry.

*CONDULET is a coined word registered in the U. S. Patent Office. It designates a product made only by the Crouse-Hinds Company.

CONDULET

First in the field

STANDARD OF QUALITY

A Nationwide Distribution Through Electrical Distributors

CH

FLOODLIGHTS • AIRPORT LIGHTING

SHOPPING FOR BETTER DISPLAY ILLUMINATION?

look to..... SMOOT-HOLMAN for quality

These lighting requirements for a new Supermarket were met by Smoot-Holman:

- continuous illumination throughout various counters
- simplified and economical installation procedures
- ease of maintenance for lamp changing and servicing
- eye appeal and quick identification of the products
- greater sales returns from better display of products
- smartly styled appearance for contemporary interior
- engineering "know how" in design and construction of the finest in quality illumination equipment

Simplex RESEARCH

WEEKS SAVES ~~DAYS~~

of Expensive Labor

NEW SIMPLEX RHW

Carries *HEAVIER* Loads at *HIGHER* Temperatures

Once more the Simplex Laboratories have "scooped" the industry by producing the first RHW Wire to meet the new National Electrical Code. This rubber-insulated, rubber-jacketed cable is rated by the Underwriters at 75°C. (167°F.) wet or dry operation. At the present time this is the only wire so rated by them.

You might logically ask, "That's all fine, but what does it mean to me?" Very frankly, it means plenty. Suppose your conduits or ducts now are loaded to their capacity, yet you have to increase the amount of current you carry through them. You have two choices: Either you can dig up and replace your ducts with bigger ones, which is a mighty expensive proposition, or you can go "modern" and use Simplex-ANHYDROPRENE Type RHW or Simplex-ANHYDREX Type RHW. ANHYDROPRENE is for use in ducts and conduits; ANHYDREX for direct burial.

You can operate the conductors of this new wire at 75°C. (167°F.) without harming the insulation. Thus your present conduits or ducts need not be disturbed. Just pull out your old cables and pull in Simplex-ANHYDROPRENE cable with RHW insulation.

This is only one of the advantages that comes to you from using Simplex RHW insulation in ANHYDROPRENE and ANHYDREX cables. Want to know more?

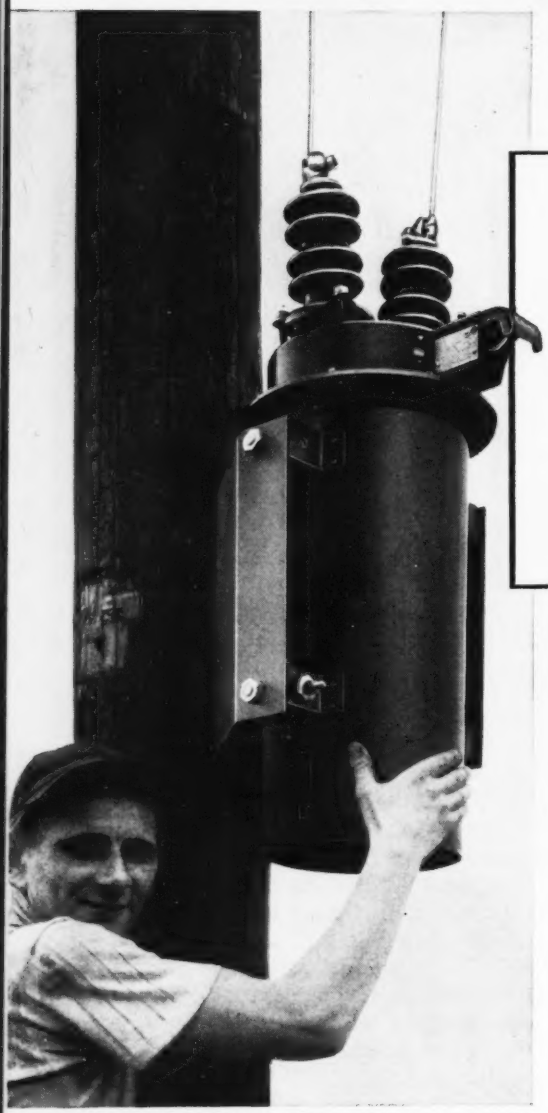
We'll gladly send you further information without obligation. If you prefer, you can get this information from your local Simplex representative.

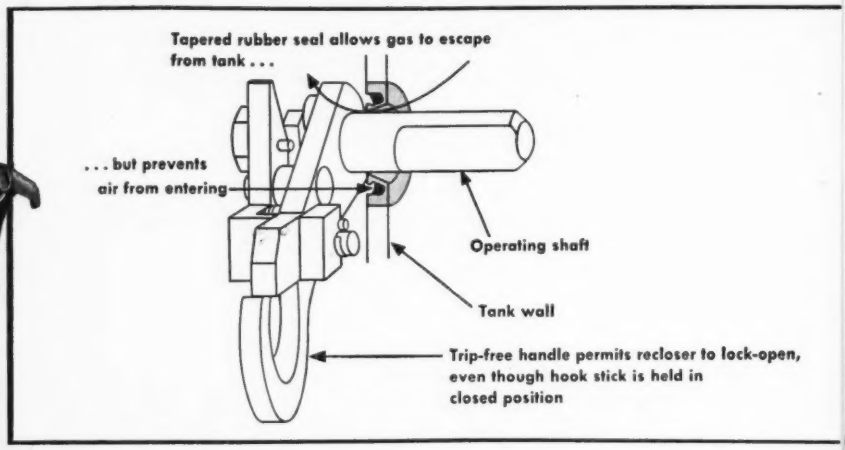
Simplex

WIRES & CABLES

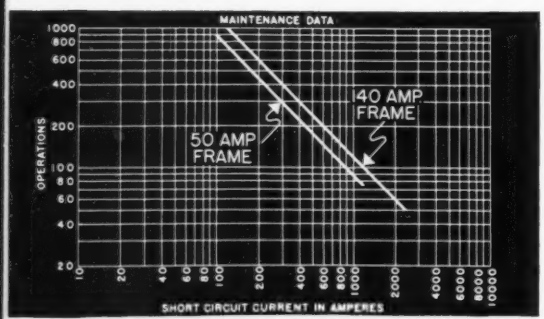
SIMPLEX WIRE & CABLE CO., 79 Sidney Street, Cambridge 39, Mass.

"No more recloser maintenance for another 3 years!"




Tapered rubber seal allows gas to escape from tank . . .
. . . but prevents air from entering
Operating shaft
Tank wall
Trip-free handle permits recloser to lock-open, even though hook stick is held in closed position

G-E's VALVE SEAL (in diagram) keeps dust, moisture from recloser, allows interruption gases to escape. Recloser maintenance is reduced two-thirds.



SUGGESTED GUIDE for number of recloser operations before inspection of 50- or 140-amp unit is based on conservative laboratory tests. With experience, time interval of 3 years may be extended later.

G-E exclusive "Sealed Unit" on Type FR Automatic Recloser permits longer inspection intervals

For the first time in the history of oil circuit reclosers, it is now possible—with General Electric's exclusive sealed unit Type FR Recloser—to schedule inspection and maintenance *only every 3 years.* Your maintenance is thus reduced to about one-third the amount considered normal for all reclosers.

GE's one-way valve seal around the operating handle shaft allows use of inhibited oil now being shipped with reclosers up to 140 amp frame size. With inhibited oil, reclosers should be inspected after the number of operations recommended on the curve in the graph at the left. In the majority of cases, the number of operations will be less than shown on the graph, and the recloser can be left in operation for the full 3 years.

With GE's new sealed unit FR reclosers, you get—

- **Exclusive valve seal that keeps out moisture and dust, yet permits interruption gases to escape.**
- **Minimum maintenance—reduced two-thirds.**
- **An available recloser design, completely interchangeable with other makes—plus top G-E quality and materials developed over a half century of manufacturing high-voltage breakers and reclosing devices.**

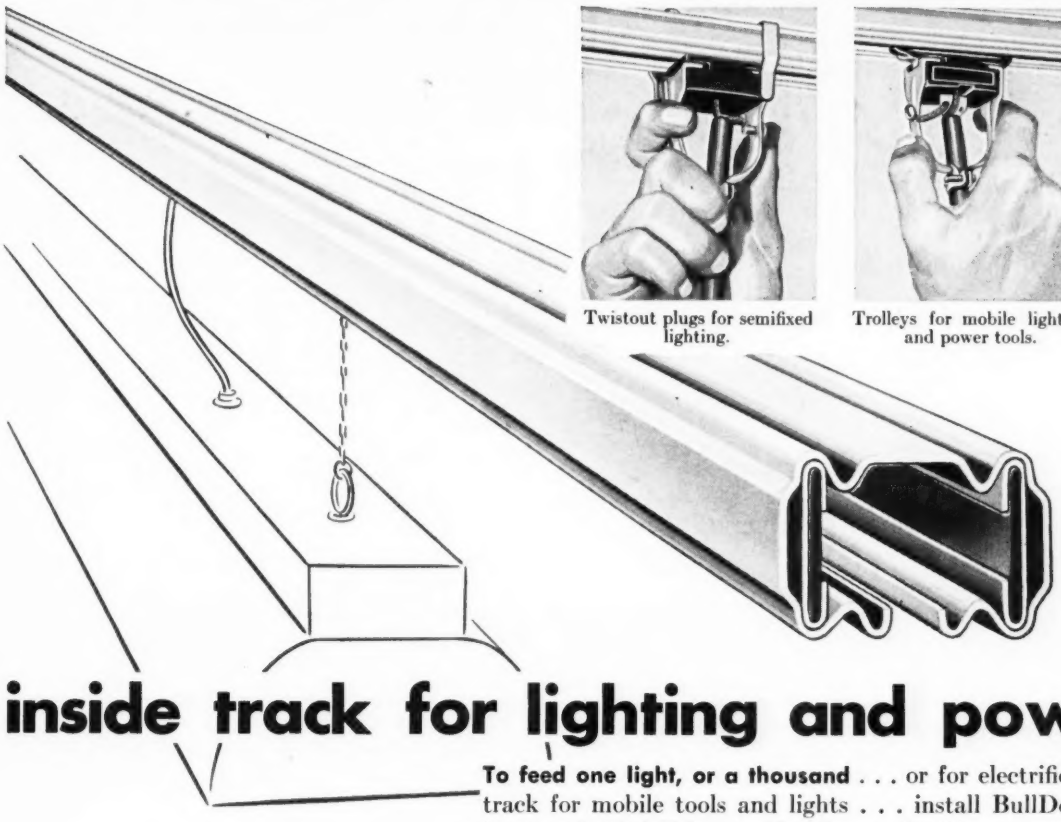
Sealed unit Type FR Automatic Reclosers come in single-phase FR-1 model and three-phase FR-3, continuous current of 5 to 140 amps, interrupting capacity of 125 to 2500 amps at 2400 to 14,400 volts. For details, write for bulletin, GEA-5961. General Electric Company, Schenectady 5, N. Y. 872-7

You can put your confidence in—

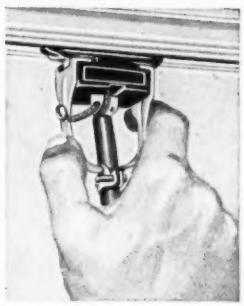
GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

BullDog Universal *Trol-E-Duct*



Twistout plugs for semifixed lighting.



Trolleys for mobile lighting and power tools.

inside track for lighting and power

To feed one light, or a thousand . . . or for electrified track for mobile tools and lights . . . install BullDog Universal Trol-E-Duct. You'll get flexible power—supplied at low cost—from this small-sized, continuous outlet duct system.

Standard 5′ and 10′ duct sections, twistout plugs, trolleys and hanger accessories make up this completely prefabricated, completely reusable system. Installation is simple, fast. Once installed, it provides complete flexibility, permitting additions or rearrangements as conditions require.

For planning help or additional information, consult your nearest BullDog Field Engineer, or write BullDog Electric Products Company, Dept.EW103, Detroit 32, Michigan.

© BEPCO

THOROUGHBRED IN ELECTRICAL EQUIPMENT

BULLDOG
ELECTRIC PRODUCTS COMPANY

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES

Coast Electric & Manufacturing Company
1720 N. E. Sixth Avenue—Tel. TUxedo 5191
Portland 12, Oregon

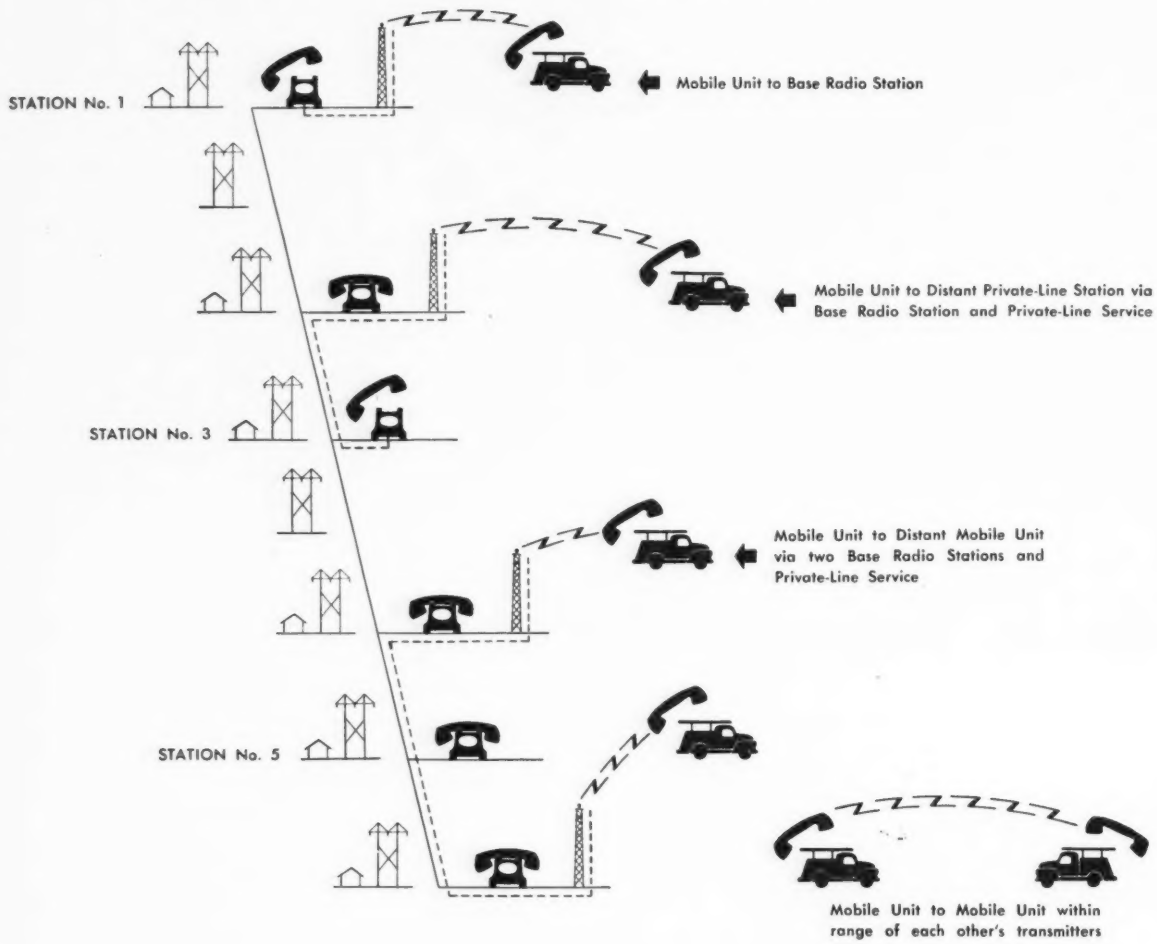
Safety Switchboard Company
1445 Stevenson St.—Tel. HEmlock 1-2470
San Francisco 3, California

BullDog Electric Products of Los Angeles
2885 East Washington Blvd.
Los Angeles 23, California

Young Electric & Manufacturing Company
2134 Curtis Street
Denver 2, Colorado

BELL SYSTEM COMMUNICATIONS

for flexibility all along the line


STATION No. 1
Mobile Unit to Base Radio Station
Mobile Unit to Distant Private-Line Station via Base Radio Station and Private-Line Service
STATION No. 3
Mobile Unit to Distant Mobile Unit via two Base Radio Stations and Private-Line Service
STATION No. 5
Mobile Unit to Mobile Unit within range of each other's transmitters

With integrated mobile radio and private-line telephone service, this Bell System setup is adaptable to many requirements.

Of course, this layout may not fit your particular needs. But Bell System engineers can design one that will. They'll study your operations, then tailor a system to your special requirements.

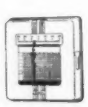
For Bell System communications you pay a fixed monthly charge—which is complete. It includes continuous maintenance, resources to meet emergencies . . . all the "extras" that would otherwise be your responsibility and expense.

Your Bell Telephone Company will be glad to study your communications problems and needs without charge.

PRIVATE-LINE TELEPHONE

TELETYPEWRITER

MOBILE TELEPHONE

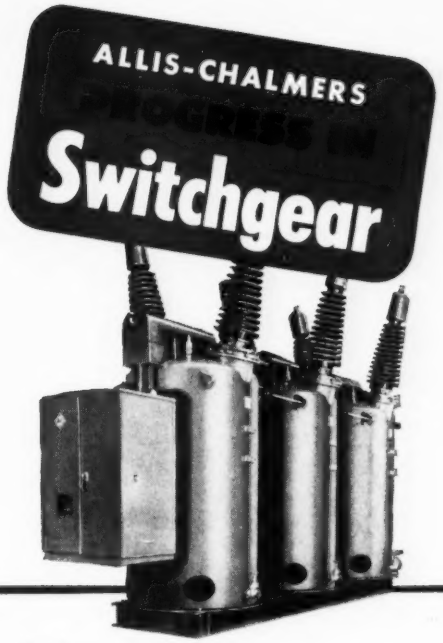

METERING CHANNELS

BELL TELEPHONE SYSTEM

RELIABILITY

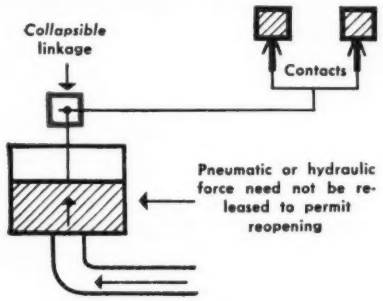
In Large Circuit Breaker Operation Depends Upon

THIS BASIC DIFFERENCE



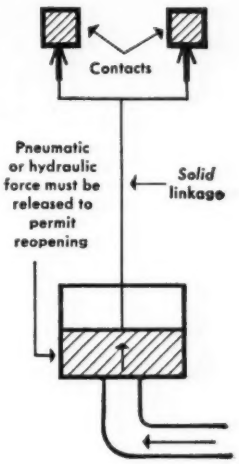
Allis-Chalmers *Mechanically Trip-Free* Mechanism

When opening after closing against a fault, the Allis-Chalmers operating mechanism does not require dumping of oil or air pressure. Trip coil simply releases a latch and the closing linkages collapse, allowing contacts to open at full speed. Operation is fully mechanically trip-free.



Other Operating Mechanisms

Air or oil pressure used to close contacts must be dumped — fast—to permit contacts to open. To do this takes a whole sequence of devices, including valves and solenoids. Everything must work perfectly. Otherwise breaker will be held closed or slowed in opening.



Opening the breaker when it closes against a fault, regardless of the position or condition of the closing mechanism, is the protective function of the breaker. To be fully protective under all circumstances, every one of your breakers should have a fully mechanically trip-free mechanism. For further details on what mechanically trip-free operation means to you, call your nearby Allis-Chalmers District Office or write Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4166

ALLIS-CHALMERS

ARE YOU PAYING FOR THIS?

AND GETTING ONLY THIS?

THE SAME money you pay for about 7 inches of copper weatherproof wire will buy *12 inches* of Kaiser Aluminum weatherproof wire! Here's what this means in dollars:

$46.27 will buy 1000 feet of #6 copper. But only $27.05 will buy 1000 feet of #4 Kaiser Aluminum neoprene or polyethylene covered wire.*

That's a saving of $19.22 per 1000 feet in material costs alone!

You are certain of big material savings with *any* type of Kaiser Aluminum weatherproof wire. What's more, the use of Kaiser Aluminum provides *additional* savings in handling, construction and maintenance costs.

These big savings, plus proved efficiency under the most rugged conditions, is the reason for the rapidly growing use of aluminum weatherproof for distribution and service lines. (Almost 90% of all transmission lines are now being built with aluminum wire.)

We have paced this growth with the development of major production facilities. Today, we are the nation's largest producer of weatherproof and insulated aluminum wire and cable.

Let us furnish you with complete information on the large economies possible with aluminum conductor. We'll give prompt attention to your request. Call or write any of our distributors or Kaiser Aluminum & Chemical Sales, Inc., Oakland 12, California.

Kaiser Aluminum

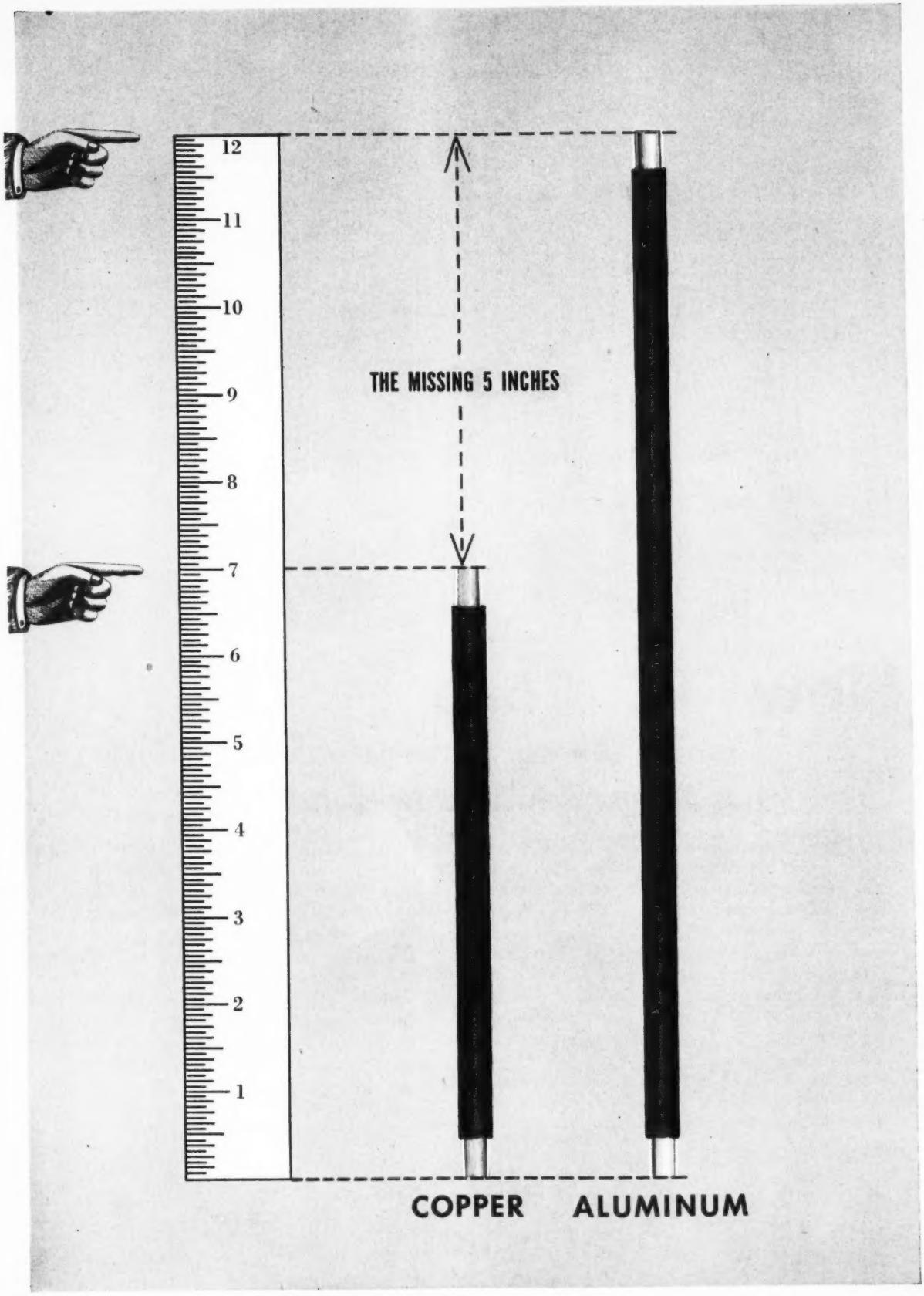
Setting the pace—in growth, quality and service

*Based on August, 1953 prices.

KAISER ALUMINUM ELECTRICAL CONDUCTOR DISTRIBUTORS

Line Material Company
General Electric Supply Company
Westinghouse Electric Supply Co.

Capital Electric Supply
Central Electric Supply Company, Inc.
Champion, Inc.
City Electric Distributors, Inc.
Crescent Electric Supply Company
Dauphin Electrical Supplies Company
Dutton-Lainson Company
Electrical & Mechanical Supply Corp.
Eoff Electric Company
Florida Electric Supply, Inc.
George H. Wahn Company
Hampden Electric Supply Co.
Hunzicker Brothers
Interstate Electric Co. of Shreveport, Inc.
Maydwell & Hartzell, Inc.
Mine & Smelter Supply Company
Nelson Electric Supply Company
Price Electric Company
Russell Beldon Electric Company
S. M. Supply Co., Inc.
Southern Minnesota Supply Company
Stuart C. Irby Company
Stubbs Electric Company
Tafel Electric & Supply Company
The Korsmeyer Company
Virginian Electric, Inc.


12
11
10
9
8
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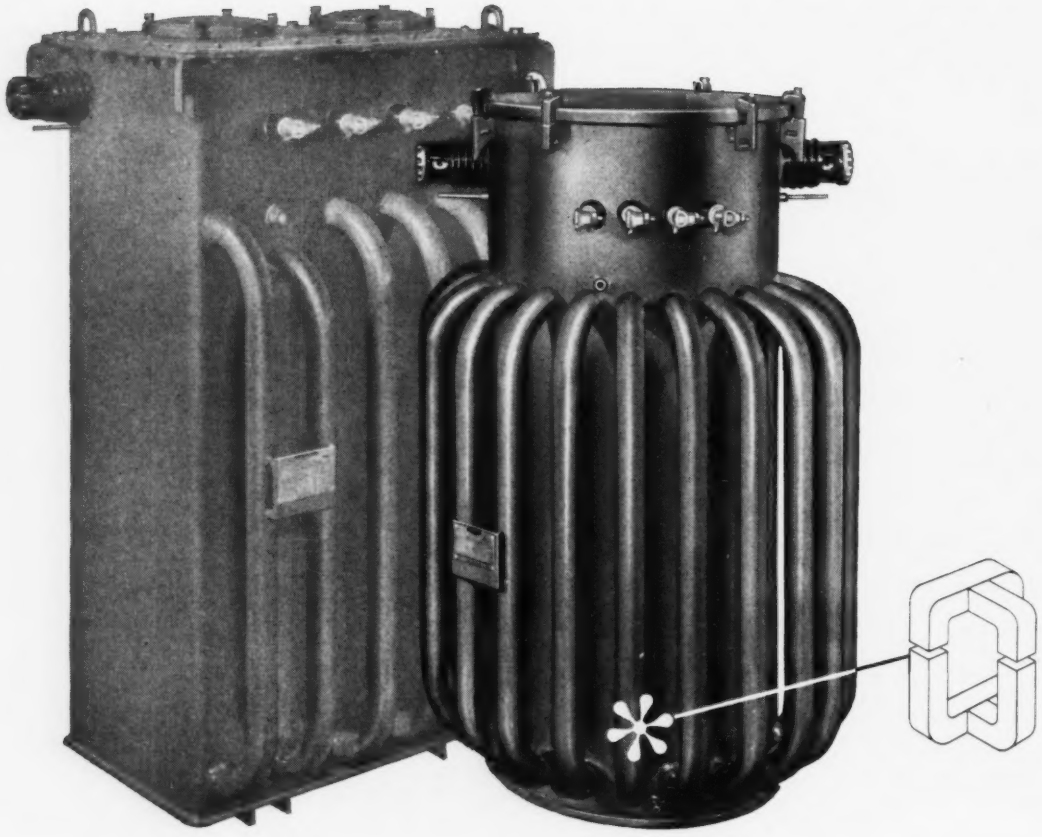
2
1
THE MISSING 5 INCHES
COPPER
ALUMINUM



New "TC" Core

permits 20% average weight reduction in 3-phase distribution transformers

If load growth indicates the need for a new or expanded 3-phase system . . . with correspondingly higher rated transformers . . . here's good news. Weight of Westinghouse 3-phase distribution transformers has been drastically reduced. In most cases, the original pole will support these new units, and they're easier to hang, easier to store as well. Primary reason: A new Hipersil® Core. Tests show that the new Type "TC" Core maintains excellent performance characteristics in a much more compact core-coil assembly.

For example, the new 75-kva conventional unit weighs only 1300 pounds, fits into a round tank 22″ in diameter. This contrasts with the superseded model at 1730 pounds in a rectangular tank, 18″ x 27″.

An even greater saving in size and weight of 3-phase "CSP®" (Completely Self-Protecting) units is achieved through the use of new, smaller LR circuit breakers.

Consider, as well, the advantages Westinghouse offers in "Coastal Finish", wall-mounted bushings with unbreakable "Enrup®" knobs, and inhibited oil. Call your Westinghouse representative for complete information, or write direct to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

***Type "TC" Hipersil Cores.** All the superior magnetic characteristics of Hipersil "C" Cores are retained with a T-leg added to accommodate 3-phase coils.

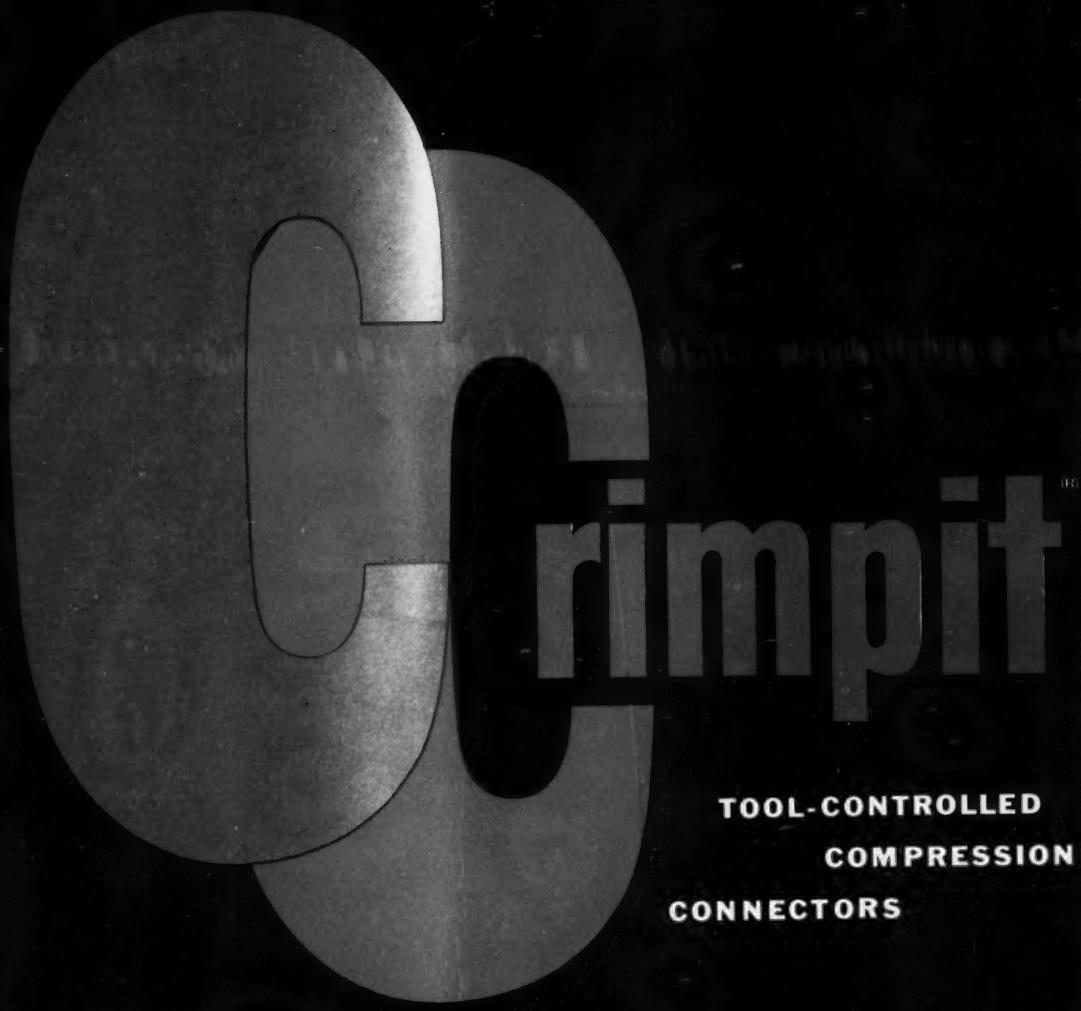
J-70675

YOU CAN BE **SURE**... IF IT'S

Westinghouse

Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver

NOW... for all overhead distribution connections



a new technique presented by

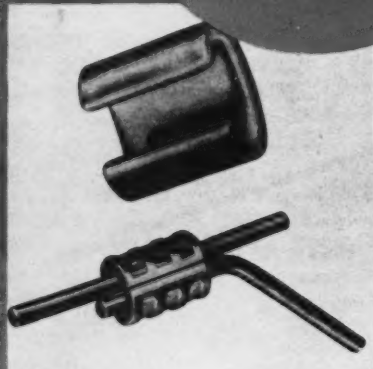
BURNDY

for all overhead

Crimpit®

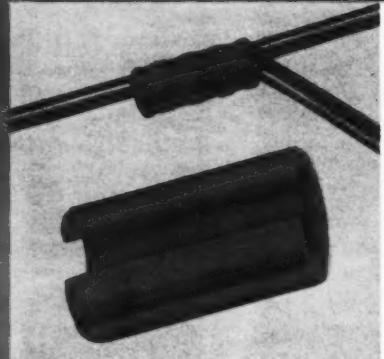
A new connection program providing the
... rapidity
... uniformity
... economy
... efficiency
of compression connections for all overhead distribution applications

COPPER TO COPPER
ALUMINUM TO ALUMINUM
ALUMINUM TO COPPER



COPPER CRIMPIT

Compact, easily-installed "C"-shaped compression tap connector, each taking a range of copper conductors. High compression provided by heavy-wall construction insures intimate contact between conductors, resulting in permanent, high-conductivity connection. 13 sizes accommodate #10 Sol. through 4/0 Str. copper.

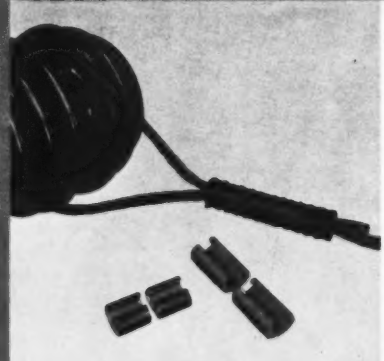


ALUMINUM CRIMPIT

Easily installed, compact "C"-shaped compression tap connector, each taking a range of aluminum or ACSR, eliminates effects of cold flow and insures intimate contact between conductors. Installed with Penetrox A to inhibit oxidation and corrosion and reduce interstrand resistance; provides permanent, highly conductive connection. 10 sizes accommodate #6 Sol. through 2/0 Str. aluminum or ACSR.

BYTAP

Al-to-Cu connector for tapping, terminating or joining Al to Cu or Cu to Al. Plastic coating permanently seals factory-bonded Al-to-Cu joint, preventing galvanic corrosion. Aluminum tubular element, factory-filled with Penetrox A to break through aluminum oxide, increase interstrand conductivity, inhibit oxidation. Sizes for #2, #4, #6 ACSR and aluminum.



CRIMPIT DEAD-END

Standard Crimpit may be employed in multiple units for dead-ending. Easily installed. Encircles conductor completely to provide secure, permanent mechanical joints developing 80% to 100% rated breaking strength of the conductor.

COPYRIGHT BY BURNDY ENGINEERING COMPANY, INC., NORWALK, CONNECT., 1953

distribution connections

FIVE MAJOR DEVELOPMENTS *in electrical distribution led to the development of the Burndy Crimpit program.*

1. Universal interest in the rapid, uniform corrosion-sealed connections made by compression tooling.

2. Increasing use of aluminum conductor in overhead lines and service drops.

3. More heavily loaded lines, requiring connections of greater efficiency, stability, and longer service life.

4. Utility acceptance of the techniques involved during Burndy's eleven-year aluminum research and development program.

5. Years of satisfactory utility experience with Burndy Hydent and Hysplice connectors in millions of installations.

Burndy Crimpit compression connectors were developed, tested, and proved to provide sounder, more stable, more efficient connections in all overhead distribution applications, copper or aluminum.

They're engineered to be installed quickly and easily with simple tooling designed specifically to overcome the practical installation problems of each application.

They're designed to accommodate a range of conductor sizes – thus reducing stock requirements to a minimum.

ALUMINUM-TO-COPPER CONNECTIONS

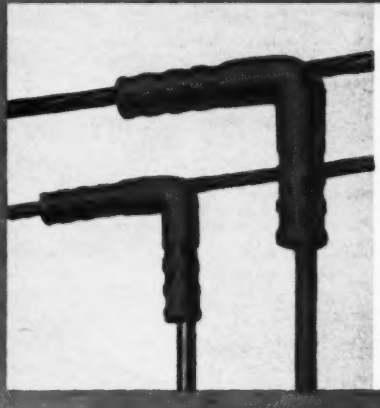
One of the major results of Burndy's compression research program was to establish the marked superiority of *aluminum* compression connectors for joining copper to aluminum. The Burndy-engineered aluminum Eltap – quickly prepared with Penetrox A – provides an aluminum-to-copper service tap that is completely stable under heat cycling conditions and whose electrical and mechanical efficiency is unaffected by galvanic action. Conductors are entirely free of corrosion – the negligible amount of corrosion that may form on the surface of the connector under severe atmospheric conditions does not affect the functioning of the connector.

SEALED INTO ANY CRIMPIT JOINT ARE:

- corrosion-free contact surfaces
- relative conductivity well over 100%
- mechanical strength to withstand twisting, icing, wind stress, or line vibration

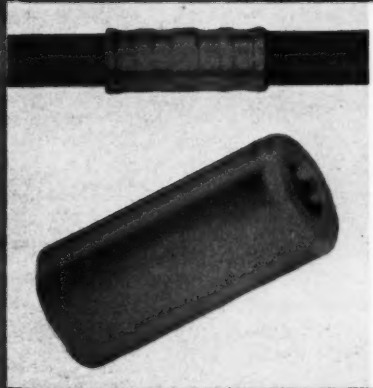
Your Burndy representative can arrange to give you full information.

BURNDY



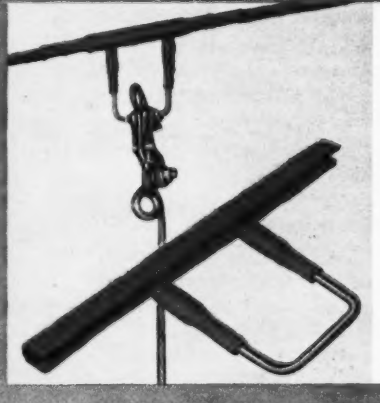
ELTAP

Rapidly installed, one-piece aluminum compression tap connector for any combination of aluminum, copper, or ACSR, run or tap, for secondary to service drop, primary to transformer, or transformer to secondary. Heavy-wall construction and long contact area inhibit corrosion and insure high conductivity. 9 sizes accommodate #6 through #2 Str. copper and aluminum and #6 through #2 ACSR.



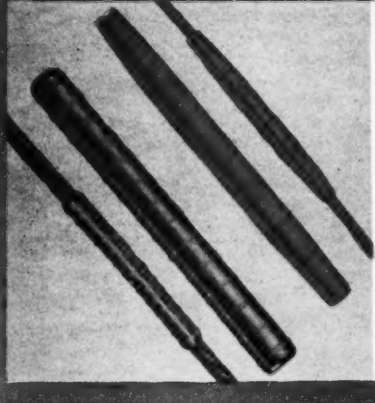
LINKIT

Service entrance compression splice each taking a range of copper, aluminum, or ACSR in any combination. Installed with Penetrox A and constructed of heavy-walled aluminum tubing to inhibit corrosion and maintain high strength, high conductivity connection. 6 sizes accommodate #6 through #2 Str. copper and aluminum and #6 through #2 ACSR.



STIRRUP

Hot line tap adapter, compression-installed on aluminum or ACSR runs, accommodates any standard copper hottap on bail element. Permits hot line tapping without arcing or chafing damage to aluminum conductor. Factory bonding of Al-to-Cu inhibits galvanic corrosion; use of Penetrox A on aluminum "U"-shaped element protects conductor, insures interstrand conductivity. Run element accommodates #4 through 266.8 ACSR and #4 through 300 Mcm aluminum.



HYSPLICE

Quickly installed line splice for all full-tension and loop applications. Full-tension Hysplices develop full rated breaking strength of conductor. Copper Hysplice for copper and Copperweld are lined with beryllium copper particles to penetrate oxide film and insure full pull-out values. Aluminum Hysplices for aluminum and ACSR installed with Penetrox A to break through aluminum oxide, reduce interstrand resistance, inhibit corrosion!

YOUR GUIDE TO BURNDY Crimpit COMPRESSION CONNECTORS

BURNDY HYDRAULIC HYPRESS (Y33RK) – Hypress with hook shaped head for greater working convenience – weighs 12 lbs. – develops 9 tons pressure overload valve insures controlled indent – manually operated – adaptable to hot line work.

BURNDY HYTOOL (MD3) – newly designed with a compound jaw and combined toggle and cam – for greater mechanical advantage. Lightweight, single stroke operation – adaptable to hot line work.

APPLICATION	COPPER to COPPER	Combinations of ALUMINUM or ACSR	Combinations of COPPER, ALUMINUM, and ACSR
PRIMARY TO TRANSFORMER or TRANSFORMER TO SECONDARY	Cu Crimpit (YC-C-)	Al Crimpit (YC-A-)	Eltap (YLU) Bytap (YEP) Stirrup (YUB-R)
SECONDARY to SERVICE DROP	Cu Crimpit (YC-C-)	Al Crimpit (YC-A-)	Eltap (YLU) Bytap (YEP)
SERVICE DROP to HOUSE ENTRANCE	Cu Crimpit (YC-C-)	Al Crimpit (YC-A-)	Linkit (YSU) Bytap (YEP) Eltap (YLU)
LINE SPLICE	Hysplice (YDS & YCS)	Hysplice (YDS-A&YCS-A)	Hyreducer (YCR)
EQUIPMENT LEADS to CUT OUTS, ARRESTORS, ETC.	Cu Crimpit (YC-C-)	Al Crimpit (YC-A-)	Linkit (YSU) Bytap (YEP) Eltap (YLU)
DEAD-END	Cu Crimpit (YC-C-) used in multiples	Al Crimpit (YC-A-) used in multiples	

EITHER TOOL INSTALLS THE FULL RANGE OF CONNECTORS

Y33RK Hypress – accommodates all sizes of all connectors for conductors through 4/0 ACSR, copper, or aluminum cable.

MD3 Hytool – accommodates all sizes of all connectors, for conductors up to and through #2 ACSR, #2 Str. copper or #2 Str. aluminum cable.

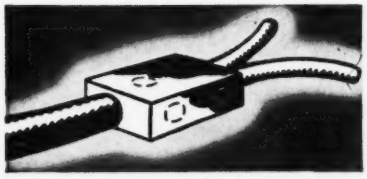
The Burndy Crimpit program offers tremendous opportunities for standardization, for economy, for improvements over past methods. Ask your representative for a detailed demonstration of these new compression connectors. Watch for the Burndy display truck, equipped for field demonstrations of Crimpit connectors. For bulletin describing the entire Crimpit program write to Burndy *today*.

53-23

BURNDY

NORWALK, CONNECT. FACTORIES: NEW YORK, CALIFORNIA, TORONTO TORONTO, CANADA
EXPORT: PHILIPS EXPORT CORPORATION

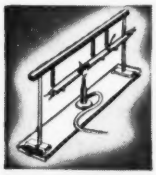
How to get longer life out of your portable cords and cables!



1 **USE** junction or distribution boxes for making multiple power connections in working places.

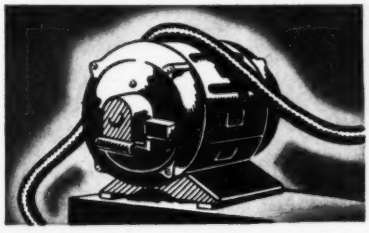
2 **PROTECT** cables with fuses or circuit breakers of the proper rating for the service. Make sure that circuit breakers will operate properly.

3 **PROTECT** cables from being run over by heavy equipment. Running over the cable a few times may not cause immediate failure, but may do internal damage which will shorten its life. If the cable must be run across an aisle, place boards on either side as one would for a hose. If it is in use for only a short time, it should be thrown over the truck.

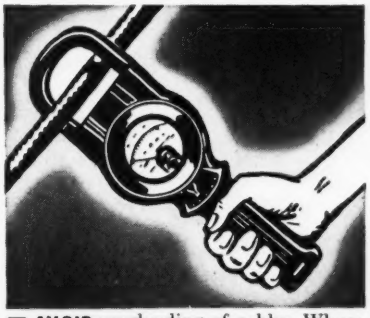


4 **USE** flame-resistant cables wherever possible.

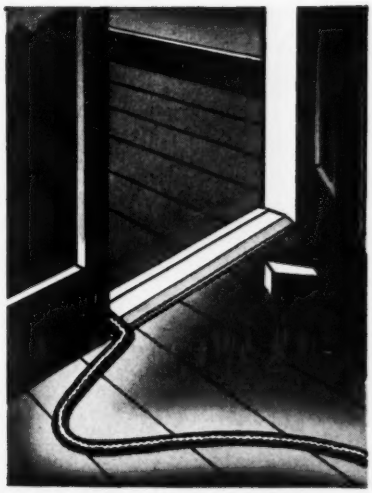
5 **DO NOT** have portable cords and cables running over steam pipes or other heat-transmitting equipment.



6 **KEEP** cables away from sparking motors and high voltage equipment. The ozone generated by sparking commutators attacks rubber jackets, causing cracking.



7 **AVOID** overloading of cables. Where possible, use I.P.C.E.A. recommended current ratings.



8 **AVOID** dragging portable cords around rough edges or sharp corners. Bruises and cuts hasten deterioration of the jacket. Never yank cords to remove kinks or loosen them when caught on a projection.

9 **AVOID** running portable cables on pulleys or drums too small for the size of the cable; observe recommended I.P.C.E.A. minimum diameters.

10 **KEEP** cords away from oils and greases. If they do get into oil, they should be wiped off as soon as possible. Avoid having cords lie in pools of water, chemicals or grease.

11 **BUY** cables that can carry the required current without overloading or overheating. They should be flexible (have sufficiently fine strands) for the intended use.

FOR FREE REPRINTS OF THIS PAGE, WRITE TO ADDRESS BELOW.

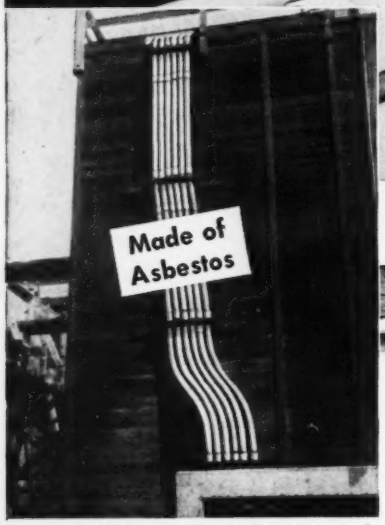
UNITED STATES RUBBER COMPANY

U.S.RUBBER
SERVING THROUGH SCIENCE

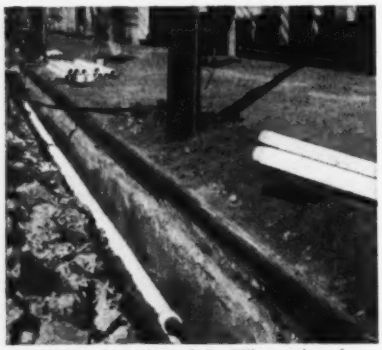
Electrical Wire and Cable Department

ROCKEFELLER CENTER • NEW YORK 20, NEW YORK

Installed over 18 years ago on this bridge, Transite Conduit is still on the job despite the attack of corrosive fumes, weather, and vibration.



Resists the Elements: Transite Ducts are standing up far longer than other materials on this cooling-tower wall despite corrosive conditions. Transite's exceptional corrosion-resistance practically eliminates maintenance and replacement costs through the years.



Outlasts other Materials: When other ducts failed to stand up under the streets of a city in the Far West, Transite Ducts were installed. Their life expectancy is far greater than that of the ducts they have replaced.

That's why TRANSITE® DUCTS stay on the job despite corrosive fumes, soils and weather

If you're looking for a conduit that will stand up for years in tough service . . . use Transite Ducts that not only resist corrosion but are immune to electrolysis, too.

Transite, you see, is made of asbestos and cement . . . two naturally corrosion-resistant materials. It stands up in corrosive cinder fills, salt marshes, and other troublesome soils. It also withstands the attack of smoke, fumes . . . and weather conditions will not shorten its service life. Since it is inorganic and nonmetallic, Transite also is immune to electrolysis or galvanic action.

You will find that Transite Ducts save you money on your cableway system not only by staying on the job longer . . . but by holding down the initial cost, too. For further information write Johns-Manville, Box 60, New York 16, N. Y.

4 OTHER REASONS WHY TRANSITE DUCTS DO A BETTER JOB AT LESS COST:

1. Incombustible. Transite will not burn or contribute to formation of smoke, gases, or fumes. It confines burnouts and protects adjacent cables.

2. Permanently Smooth Bore. Transite makes long cable pulls easy. Danger of damage to cables is also minimized.

3. Easy To Install. Transite Ducts are light weight, easy to handle. Joints are quickly made. And, long 10-foot lengths reduce the number of joints in the line.

4. Higher Thermal Conductivity. Cables run cooler in Transite Ducts, reducing I^2R losses, increasing current capacity, and prolonging insulation life.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville TRANSITE DUCTS

TRANSITE KORDUCT—for installation in concrete

TRANSITE CONDUIT—for exposed work and installation underground without a concrete encasement

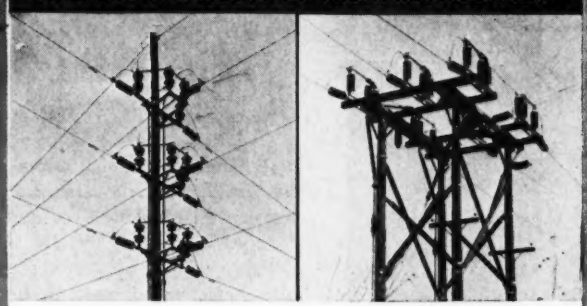
4 money saving reasons

why Matthews GOABS* have gained nationwide acceptance *in only three years!*

- **Reduces structure costs...** mounts on single pole eliminating need for multi-pole structures.
- **Saves valuable, hard-to-get line crew time...** mounting of switch is simple, requires less hardware.
- **Requires minimum right-of-way...** no expensive additional right-of-way.
- **Safe and easy maintenance...** linemen like 180° free climbing space... particularly advantageous for hot line jobs.

*Gang Operated Air Break Switch

COMPARE THE COSTS OF THESE INSTALLATIONS



Bulletin 601-A contains complete information on the Matthews GOABS. Send for your copy today.

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DIVISION OF THE A. B. CHANCE COMPANY

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20 Years'

ALLIS-CHALMERS

POWER

Transformers

Simple, Rugged Design

Quick-Break tap-changing mechanism gives long contact life. Here's why: taps are changed with such speed and effectiveness that contact deterioration is negligible. Maintenance requirements are reduced by the highly efficient, simple design. All moving parts operate under oil — even the driving motor. There is nothing to lubricate or adjust. Self-aligning couplings between operating mechanism and dial switches eliminate any danger of misalignment. Every nut and bolt is securely locked in place.

Field Proof-

Here's the Tap-Changing-Under-Load Mechanism That Has Given 20 Years of Unequalled Performance

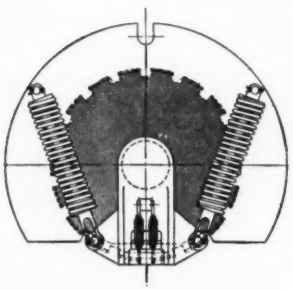
Field-proved — and unsurpassed in twenty years — that's the story behind Allis-Chalmers famous *Quick-Break* tap-changing mechanism. No other tap changer on the market gives you its combination of ruggedness, accuracy, and simplicity — features that add up to practically trouble-free operation.

Laboratory-proved — tests show that the *Quick-Break* mechanism will withstand 5 million operations — equivalent to over one hundred years of normal service. The *Quick-Break* mechanism was designed to operate under the most difficult conditions. After twenty years of field operation, it is still the simplest, most efficient means of changing taps under load.

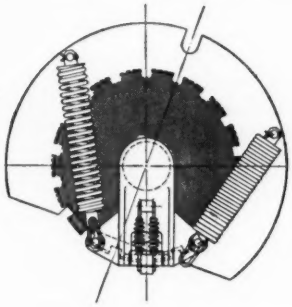
Get More Facts. If you don't have all the facts already, it will pay you to get more details by contacting your nearby Allis-Chalmers office or writing Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4127

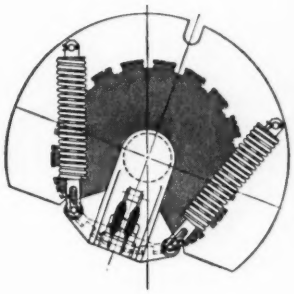
How It Works



1 Dial switch operates on the balanced spring principle. Components include outer moving segment, inner stationary index plate, and powerful springs for fast drive snubbing action.



2 Start: driving motor rotates outer segment but latch on crank arm holds tap switch in position. Heavy-duty springs store energy to produce quick start and stop of switch.

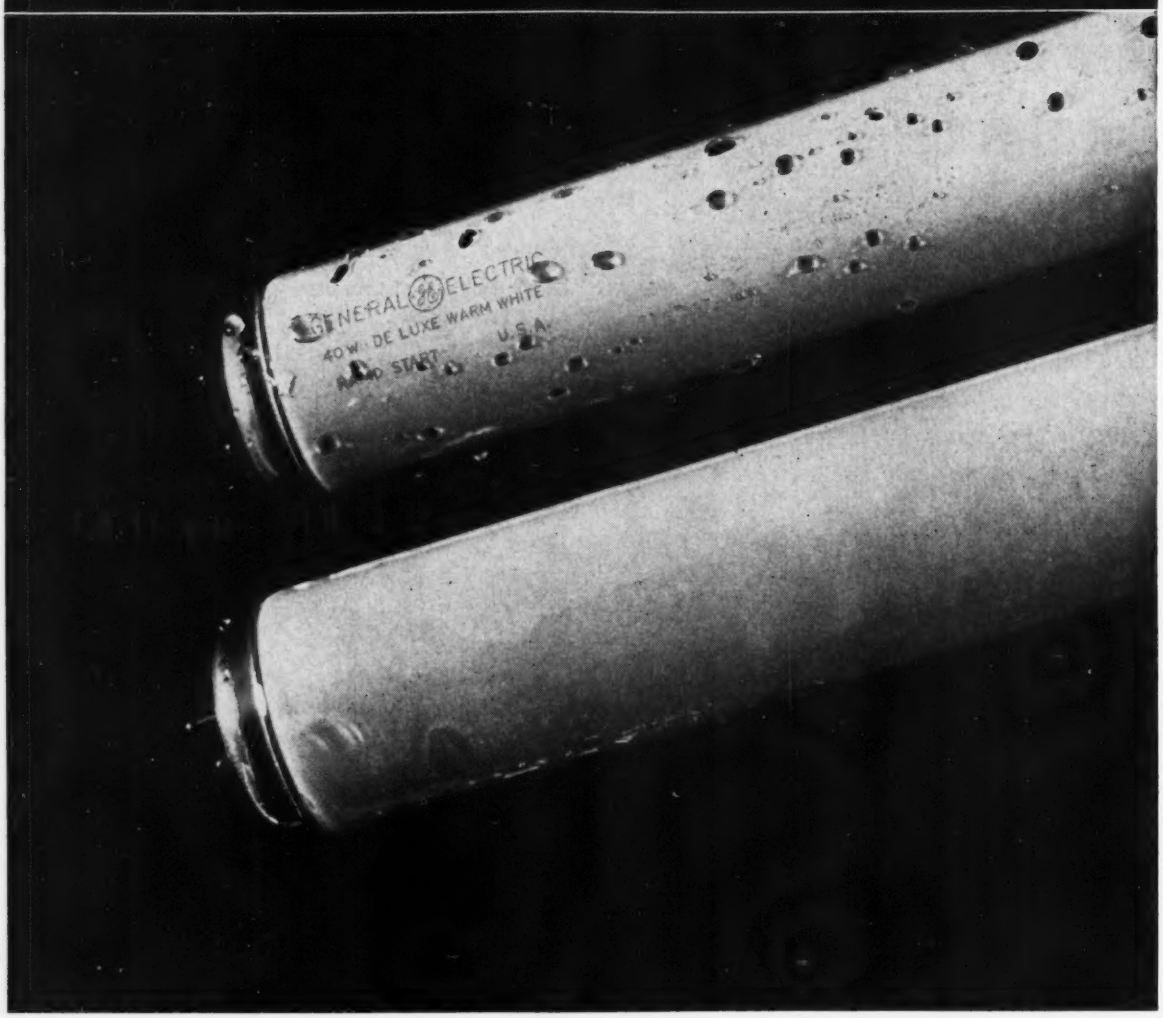


3 Finish: cam on segment lifts latch. Released spring tension rotates switch swiftly to next operating position. Latch locks switch and places mechanism in position for next change.

ALLIS-CHALMERS

A-C ALLIS CHALMERS

You expect the best value from G-E fluorescent lamps



Silicone coat on new G-E Rapid Start lamps helps them start quicker

Moisture in the air can make a fluorescent lamp slow to start. The wet film that condenses on the lamp is a good enough conductor to detour some of the electricity needed for proper starting.

General Electric has tailored a "raincoat" that stops this. It's made of silicone and breaks up the wet film into tiny droplets, leaving dry areas that interrupt the electrical contact. Less current is stolen. Starting is quicker, surer.

We call the coating Dri-Film*. The photo above shows the difference it makes. Moisture breaks up into droplets on the Dri-Film* lamp, forms a smooth coating on the ordinary lamp.

You get Dri-Film* on G-E Rapid Start lamps. It's invisible, won't rub off, helps assure you all the light you pay for. Many leading manufacturers have designed lighting fixtures to use Rapid Start lamps and their special Rapid Start ballasts. You *expect* the best value from G-E fluorescent lamps. Here's another reason you can.

For more information, write General Electric, Department 166-EW-10, Nela Park, Cleveland 12, Ohio.

*Reg. U. S. Pat. Off.

You can put your confidence in—

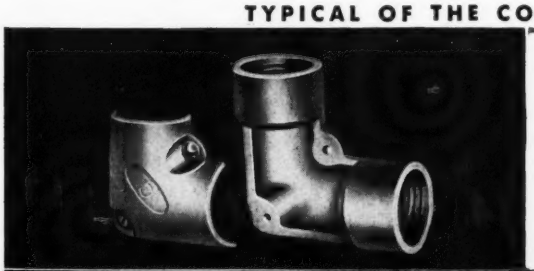
GENERAL ELECTRIC

FOR CORNER PULL-IN ELBOWS, 3-PIECE CONDUIT COUPLINGS, PIPE STRAPS—CLAMP BACKS—NEST BACKS

GEDNEY *ALWAYS!*

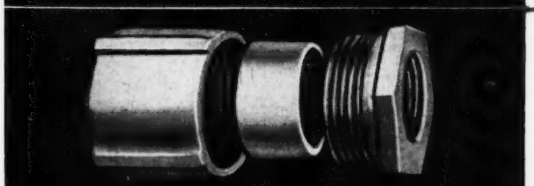
NATURALLY you want to cut installation time and costs. And you'll do it easily with Gedney Fittings, for these fittings are accurately machined and threaded, smooth finished, individually inspected to ensure top quality. What's more, Gedney Fittings are made of unbreakable malleable iron. For best profits, order Gedney always!

TYPICAL OF THE COMPLETE GEDNEY LINE ARE:



Corner Pull-In Elbows in ½", ¾" and 1" sizes. Ideal for space-saving, machine wiring, easy wire pulling. Cadmium plated.

Now available in 1¼", 1½" and 2" sizes



3-Piece Conduit Couplings in a large range of sizes from ½" to 6". Cadmium plated.

One-Hole Pipe Straps, Clamp Backs, and the handy new Gedney Nest Backs. These supplementary spacers nest firmly behind the Clamp Backs—use as many as you need to hold pipe at desired distance from wall. Hot dip galvanized to prevent corrosion.

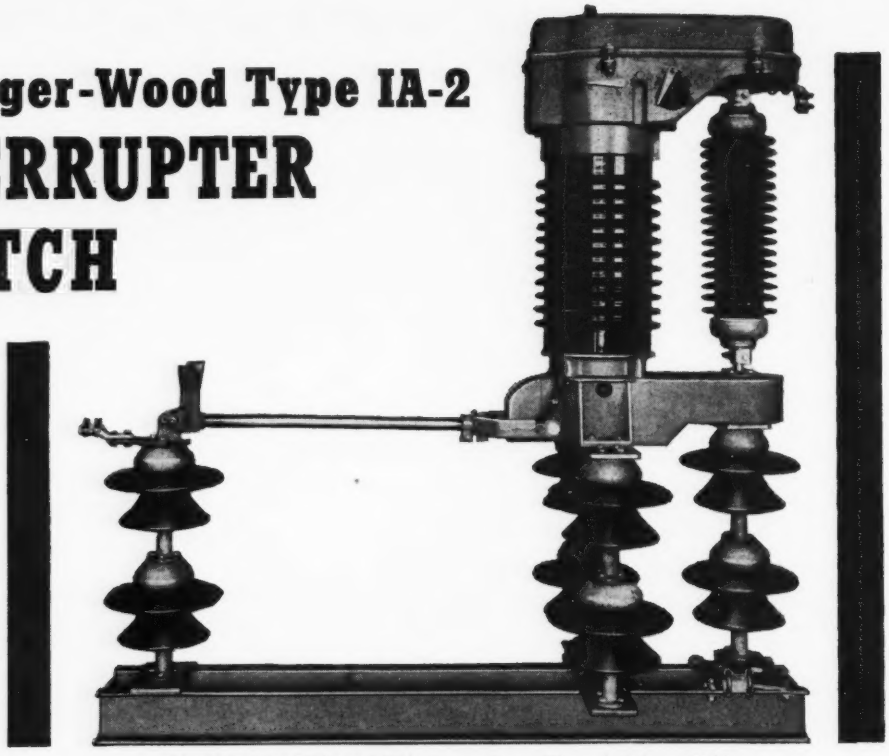
GEDNEY FITTINGS FIT

GEDNEY
ELECTRIC COMPANY

GEDNEY

RKO BLDG. • RADIO CITY • NEW YORK 20
Foundry, Factory and Shipping Point: Terryville, Conn.

Schwager-Wood Type IA-2 INTERRUPTER SWITCH



Single Pole 69 KV-250 MVA shown above. The switch is available in ratings from 34.5 KV to 115 KV. The 115 KV Interrupter Switch is also available in an interrupting rating of 500 MVA.

The Schwager-Wood Interrupter Switch offers real economies in switching and protection of transformer banks, and in the dropping of long line charging currents. This switch also gives protection against faults within the range of its interrupting rating.

Low original cost, minimum installation and maintenance expense have proved this Interrupter Switch to be a money-saving investment.

SCHWAGER-WOOD CORPORATION

High Voltage Switchgear • Substation Design, Equipment • Bus Fittings, Connectors **PORTLAND, OREGON**

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ANACONDA FORUM
for the Electrical Industry

MODERNIZATION AND ELECTRIFICATION— A LOOK AHEAD

by: Maxwell Cole
Manager Market Studies and Service Division
Philadelphia Electric Company
Philadelphia, Pa.

AMERICAN industry, its vision of new products for better living, its ingenuity in developing new methods and materials to make them, and its courage to invest in the facilities to produce them is the cornerstone on which American living standards have been erected. To make more things, faster, better and cheaper so that they may be available to more and more people has been the goal of American industry. Its success in reaching toward that goal has been its outstanding accomplishment.

REPLACING MANPOWER WITH HORSEPOWER

Operating in a free competitive economy, at liberty to develop new products and better ways of making them, American industry has taken full advantage of the opportunities offered by modern, high speed tools powered by electricity to increase its productive capacity, to improve its product and to reduce costs by replacing manpower with horsepower. Refrigerators and washing machines, automobiles and jet-propelled planes, plastics and stainless steel and many other of today's conveniences, even necessities, would not be available in sufficient quantity or at low enough prices to have become accepted elements of American life but for the readiness of industry to accept new products and new methods and to modernize their facilities to accommodate them. Industry's readiness to streamline production methods and modernize facilities enabled us to snow our enemies of World War II under an avalanche of production.

NEW CHALLENGES

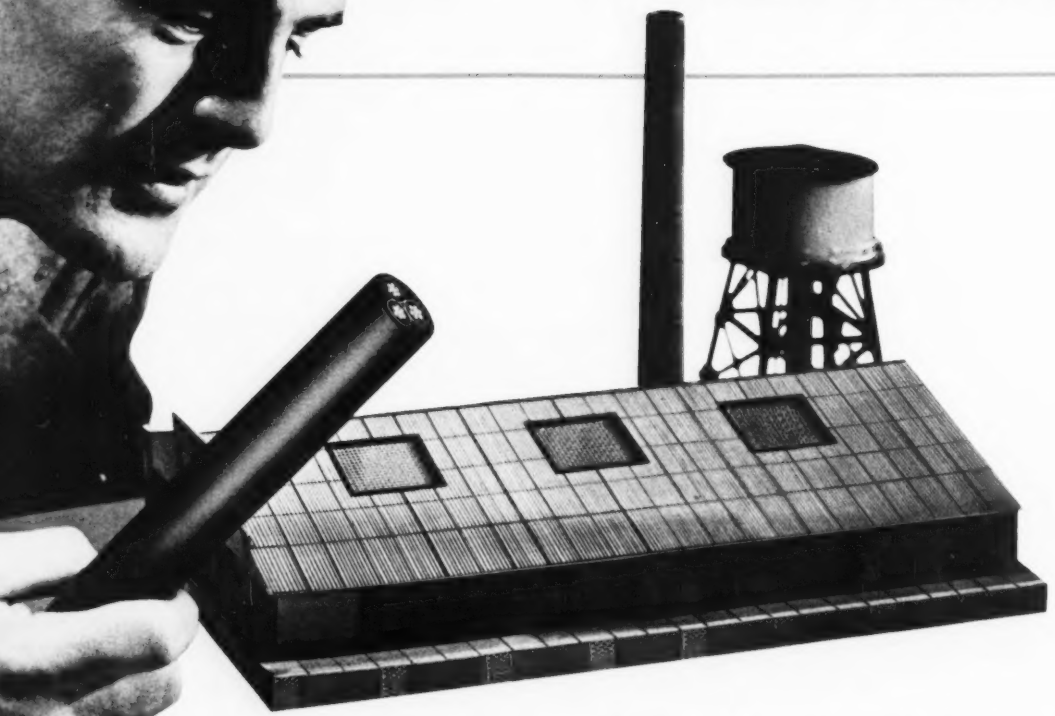
Today, industry faces new challenges. It must produce materials of war in such quantity and of such quality that no enemy dare attack us; it must maintain progress in fields of civilian production; and many people believe we are entering an era of keener competition than experienced for many years. Industry's ability to meet these challenges depends on its willingness to continue to modernize facilities and keep abreast of progress.

CONTINUED MODERNIZATION LIES AHEAD

We stand only on the threshold of the promises science and industry hold out for our future strides into security and better living. These promises will become realities only as better, more powerful tools are developed for producing them and as industry maintains its courage in investing in them to continue our national progress and replace wasteful or obsolete methods. Contemplating such a vista of promises, with faith that American industry still possesses characteristics which raised it to its present level of greatness, one foresees continued modernization of American factories, processes and products at a pace even greater than it has been in the past.

AMERICA'S CHALLENGE to industry is to meet and sustain an increasingly higher level of production in the face of keen competition. New and better equipment—such as this installation of a 75,000-pound chain drawbench in a Connecticut Mill—is a vital part of expansion and modernization. With each new machine comes the need for increased power and modern wire and cable!

A LOOK AT MODERN



It was great sport but . . .

EVER SEE A STUTZ "BEARCAT" on the road these days? With loving care and a knack for tinkering, hobbyists still keep a few going. They are good cars . . . but hardly economical modern transportation. Now consider how much antique wiring lies around still doing a job . . . of sorts. Hardly efficient. Pathetically unprofitable when pitted against modern power needs. What are we going to do about it? The following article gives some good reasons for re-evaluating our requirements for reserve capacity and replacing obsolete wiring . . . with new and better products.

ONCE MORE it's a case of growing pains! Today industry has already used up its power reserves—though these were considered adequate ten years ago. Now it's time for another upward revision of our ideas of what is a sufficient power margin for operating the new production tools that have been put in our hands. To power them, utilities are now in the process of re-doubling their load capacity. Our stepped-up rate of production and consumption has telescoped the future . . . even beyond the soberly considered estimates of industry leaders as recently as a decade ago!

The link between tool and power source is wiring. New tasks suggest new techniques . . . new tools . . . new power loads . . . new wiring to carry the load. Yesterday's wiring may bottleneck today's production flow.

Some existing plants haven't spotlighted their wiring in many a year. Now—with new production factors in the picture—it is time for a basic survey of wiring. If it's obsolete, replace it . . . and reap the benefits of more efficient power, greater reliability, and long-range economy.

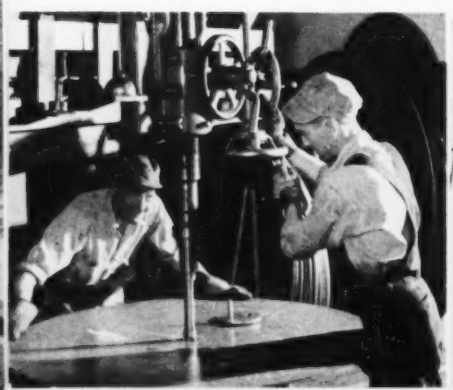
Modern wiring has seen a wealth of new developments—especially in insulation. Let's take a quick look at what's been done. It's all interesting, practical and valuable.

RUBBER INSULATION

Modern wiring may be defined as that approved and accepted since World War II. Twenty years ago we spoke of "enormous strides" in such things as rubber compounding. These resulted in superior products. We

ANACONDA was the first manufacturer of wire and cable to use synthetic resin compounds for insulation. One example is DENSHEATH*—a high-grade and super-aging thermoplastic (vinyl resin). This is widely used today for wiring on (1) machine tools, (2) appliances, and (3) various types of signal systems—as well as for control or switchboard, building or general purpose wiring.

*Reg. U.S. Pat. Off.



DEVELOPMENTS IN WIRING INSULATION

ARE WE ASKING OBSOLETE WIRING TO DO TODAY'S NEW JOBS?

can still speak of "progress." There has been lots of it. They are still striding forward—the chemists, metallurgists, cable engineers and their co-workers. The end is not in sight.

Heat is the great enemy of electrical insulation. But today Code Rubber, Type R, does a much better job in withstanding heat than a few years ago. TABLE I shows how this and other rubber compounds compare.

KIND OF INSULATION	MAXIMUM ALLOWABLE CONDUCTOR TEMPERATURE		
	1940	1947	1953
	degrees C		
Code, Type R	50	60	60
Type RW	50	60	60
Type RH	75	75	75
Type RH-RW	—	—	75,60**
Heat- and moisture-resistant	60,70,75	75,80	75,80
Ozone-resistant* (ASTM oil base)	70	70,75	70,75
Ozone-resistant* (butyl)	70,75	75,80	80,85

*Temperature varies with manufacturer
**whether in dry or moist location

TABLE I

Type RH-RW is outstanding. This is being used so much now—at little more cost than Type R—that the latter has a narrower market than even just after the war. Ozone-resistant, butyl-base compound is another excellent performer. Its stability, long aging, low power factor and other desirable physical and electrical properties under severe operating conditions make it a dependable compound for voltages up to 15 kv and sometimes higher. Several manufacturers supply it.

During World War II natural rubber was out. Synthetic (G-RS) rubber took its place. In just a few years, cable manufacturers found many things in its favor . . . so many, in fact, that the natural product is disappearing as a wire and cable insulation. "Cold" rubber is another development. Coming fast into regular use, it brings improved physical and electrical properties to low-voltage cables.

B-r-r-r . . . now I'm cold!

Another forward stride is the pre-war development and post-war application, in great quantity, of neoprene jacketing for rubber-insulated cable. Dependable under many severe conditions, relatively inexpensive, it is excellent in moist or dry conduit, direct burial, in aerial and other locations.

THERMOPLASTIC INSULATION

You can do a modern wiring job today with materials barely existing or unknown as late as just before World War II. These are the thermoplastics. Two stand out as basic insulations: polyvinyl chloride (vinyl resin and one or more of its co-polymers, which appear under various trade names) and polyethylene.

Polyethylene is a remarkable insulation for many purposes. It made radar possible. Now, however, the real workhorse of the industry is the first—PVC for short.

Millions of feet of PVC are used annually for wiring houses, stores, office buildings, by the armed forces and in many industrial applications. It resists many enemies of insulation: oil, moisture, acids, alkalies, abrasion, greases, and gasoline. With just normal treatment, it has a long life.

There are many other thermoplastics; the list has grown long in just a few years. But only a few others are used for insulations. Among them are Rulan, Nylon, Cardolite, Saran, Tenite II, Styraloy, and Teflon.

Polyethylene has a very high dielectric strength, low power factor and low moisture absorption when compared to vinyl resin. The latter has lower dielectric strength, high dielectric loss, and satisfactory moisture resistance. Vinyl resin resists ozone. Polyethylene is immune to it. This indicates why polyethylene can be used for high-voltage and high-frequency circuits while vinyl resin, which is cheaper, does very well on low voltages. Both have a weakness. They become plastic at comparatively low temperatures. High overloads on these types of conductors must be guarded against. TABLE II lists some comparative values.

Kind of Insulation	Code Type	Application	Maximum Allowable Conductor Temperature and Location (degrees C)
vinyl resin	T	general purpose	60 dry locations
vinyl resin	TW	general purpose	60 moist locations
vinyl resin	—	machine tool control and switchboard	60 in oil 80 in air
vinyl resin	—	appliance wiring	80,90, or 105 in air only*
Polyethylene	—	general purpose	80 usually special

*depending on compound used

TABLE II

"Thermoplastics help me reduce."

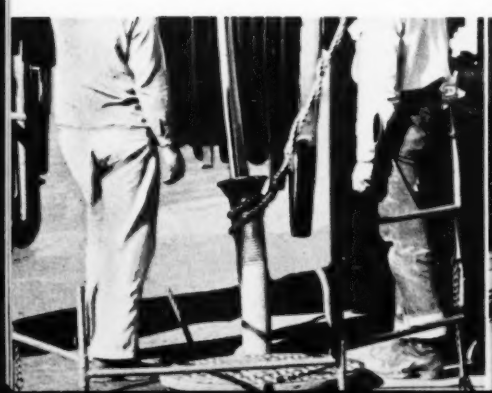
Logically thermoplastics replace rubber insulations for some applications—but not for all. In building wire one outstanding property of thermoplastics is toughness. They require no protective braid. Hence, wire so insulated takes less space.

* * *

This article provides only a brief sketch of a fascinating field. Lower operating costs from more efficient power distribution influence plant profits. In the light of developments discussed here, many readers may want to re-evaluate their own wiring. It's a timely undertaking. We suggest that for more details you write to, or consult with, individual manufacturers.

DURASHEATH* neoprene-jacketed cable has ANACONDA Type ANW (cold-rubber) or Type AB (ozone and heat-resistant butyl) insulation, depending on voltage rating. Used for (1) distribution networks and where wet ducts may contain acid or alkali waters, (2) industrial power distribution overhead, in direct burial, or conduit, (3) circuits in conduit—and many other applications.

*Reg. U.S. Pat. Off.



If you want to cut equipment-relocation costs . . .

WIRE MACHINES TO MAKE THEM MOVABLE

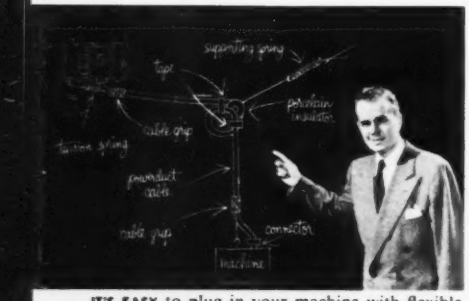
Basic industry strategy calls for more productive machine power. Look into plants like those of the automobile makers. There large banks of automatic machines are lined up in close array. They turn out parts. One bank may occupy only a small part of the long, huge floor area required.

MACHINES SOMETIMES MOVED

Each machine needs a cable. Offhand it seems easy to get cable to machine. But actually some ingenuity is needed to avoid excessive installation costs. The situation is aggravated by the chance that next year —or next month—all machines must be moved in accordance with model changes or plant efficiency.

BUS AND BUSDROP CABLE

You can solve the whole problem very neatly. First install a busduct system on ceiling or under roof trusses. Then connect each machine to it with a flexible cable carrying power and grounding conductors. This cable is called "busdrop cable."

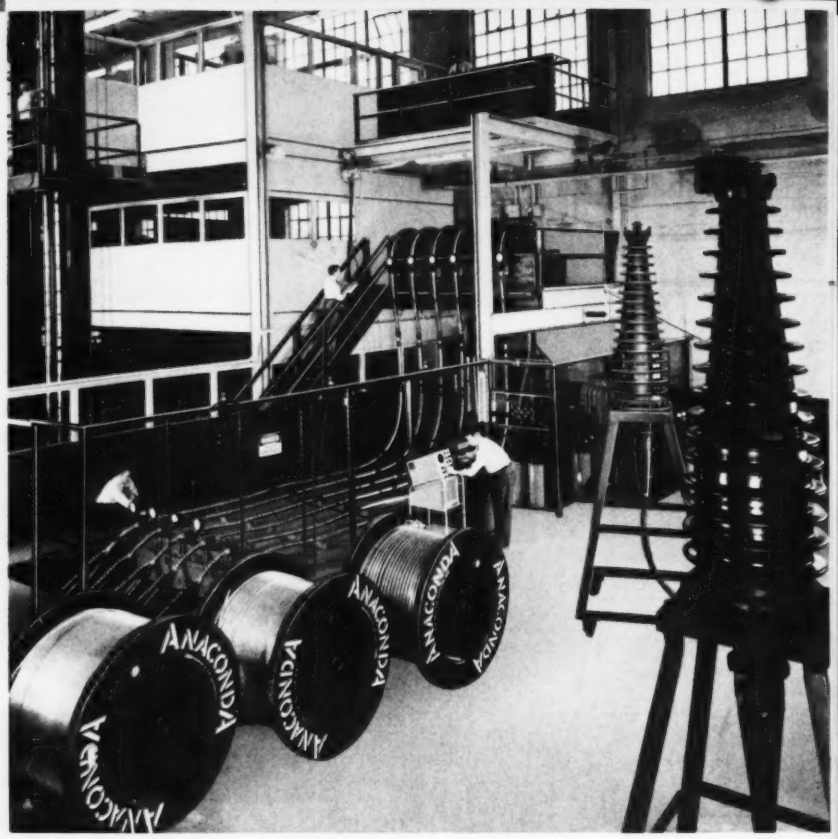


IT'S EASY to plug in your machine with flexible busdrop cable. There's no rigid conduit to rip out later.

TAILOR-MADE SYSTEM

Busduct Power Distribution Systems are widely used. They may be bought tailored to any plant's needs. They are economical; cable can be disconnected and reused elsewhere. This is done often. It means real flexibility, saves time and maintenance costs. It helps industry to keep up its high pace of production.

To do its job right, to last long and to stay neat, busdrop cable must be able to take heavy mechanical abuse and must handle easily. It must be impervious to oils, acids, water, greases, and cutting compounds. And, of course, it's always wise to look for approval from Underwriters' Laboratories, Inc. 53384



LAB THAT HURRIES TIME

. . . CUTS YEARS TO MONTHS IN TESTS TO GIVE YOU LONGER-LASTING CABLES

In this Cyclic-Aging Laboratory at Hastings-on-Hudson, N. Y., high-voltage insulated cables race through the calendar. Once the valuable data which cable-aging made available to electrical engineers took decades to accumulate in actual service—often 20 to 50 years. But here a lifetime of experience is gained in a few years. Rigorous 24-hour test cycles simulate actual conditions . . . but are much more severe. Anaconda Engineers get vital data on cable life, stability and other characteristics needed to evaluate cable design.

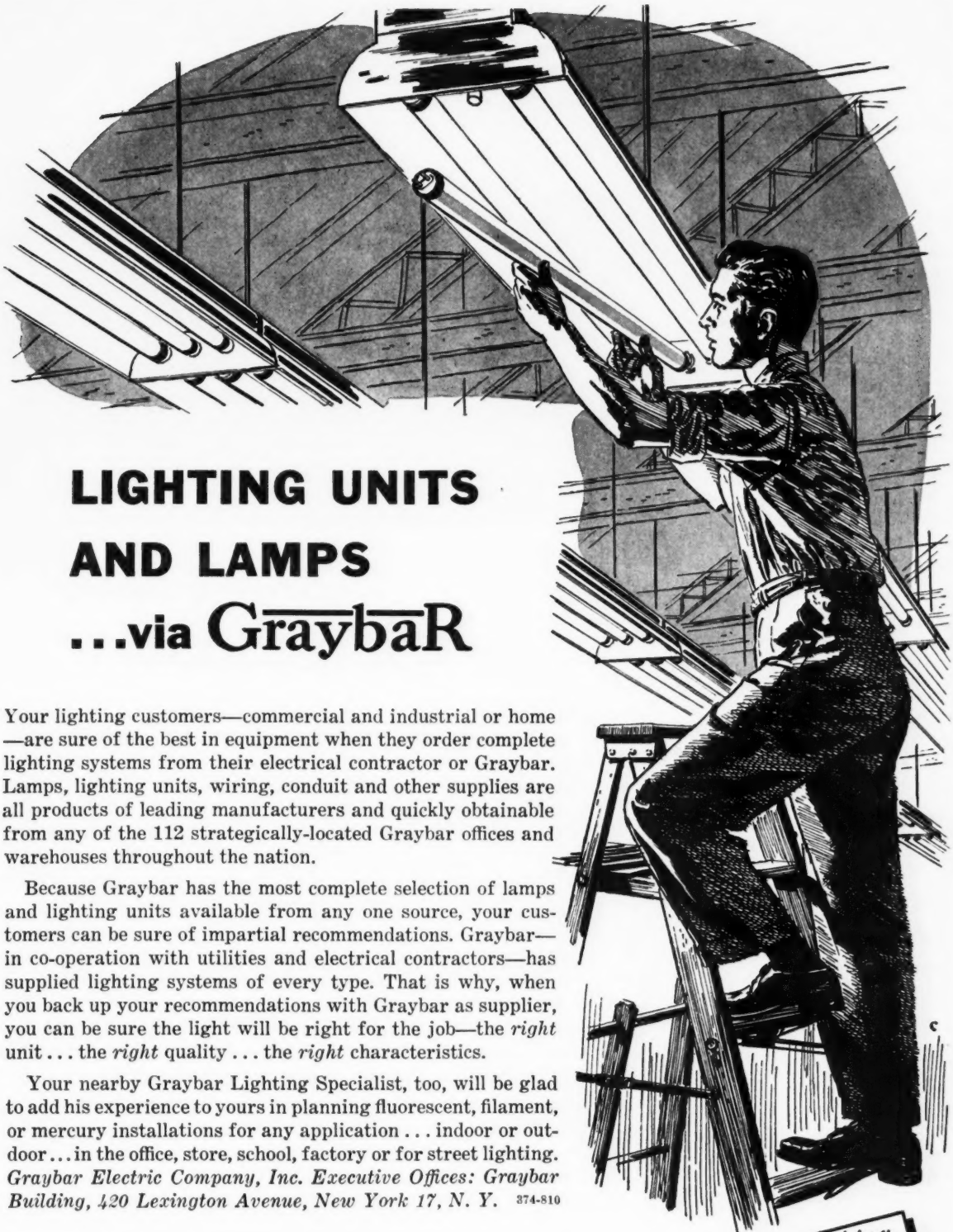
This is typical of Anaconda planning—geared to the future. It is only a part, however, of a company-wide program of expansion and improvement now nearing completion in mills and mines. Net result: better cables, available in larger quantities, that last longer and give you *true* economy in use *when you specify* ANACONDA.

FOR FURTHER INFORMATION about any product mentioned in the pages of this advertisement, see your Anaconda Representative . . . or write to *Anaconda Wire & Cable Company, 25 Broadway, New York 4, N. Y.*

ANACONDA®

TODAY'S HEADQUARTERS FOR WIRE AND CABLE

MAKERS OF building, barn, machine tool, control and communication wire • service and overhead distribution cables, bare and weatherproof including ACSR • portable cords and cables • power and busdrop cables • mine, bridge, aerial, underground, duct, network and submarine cables • parkway, airport and street-lighting cables • station, apparatus and vertical-riser cables • magnet wire • copper, aluminum and copperweld conductors • wire and cable accessories.



LIGHTING UNITS AND LAMPS ...via GraybaR

Your lighting customers—commercial and industrial or home—are sure of the best in equipment when they order complete lighting systems from their electrical contractor or Graybar. Lamps, lighting units, wiring, conduit and other supplies are all products of leading manufacturers and quickly obtainable from any of the 112 strategically-located Graybar offices and warehouses throughout the nation.

Because Graybar has the most complete selection of lamps and lighting units available from any one source, your customers can be sure of impartial recommendations. Graybar—in co-operation with utilities and electrical contractors—has supplied lighting systems of every type. That is why, when you back up your recommendations with Graybar as supplier, you can be sure the light will be right for the job—the *right* unit . . . the *right* quality . . . the *right* characteristics.

Your nearby Graybar Lighting Specialist, too, will be glad to add his experience to yours in planning fluorescent, filament, or mercury installations for any application . . . indoor or outdoor . . . in the office, store, school, factory or for street lighting. *Graybar Electric Company, Inc. Executive Offices: Graybar Building, 420 Lexington Avenue, New York 17, N. Y.* 374-810

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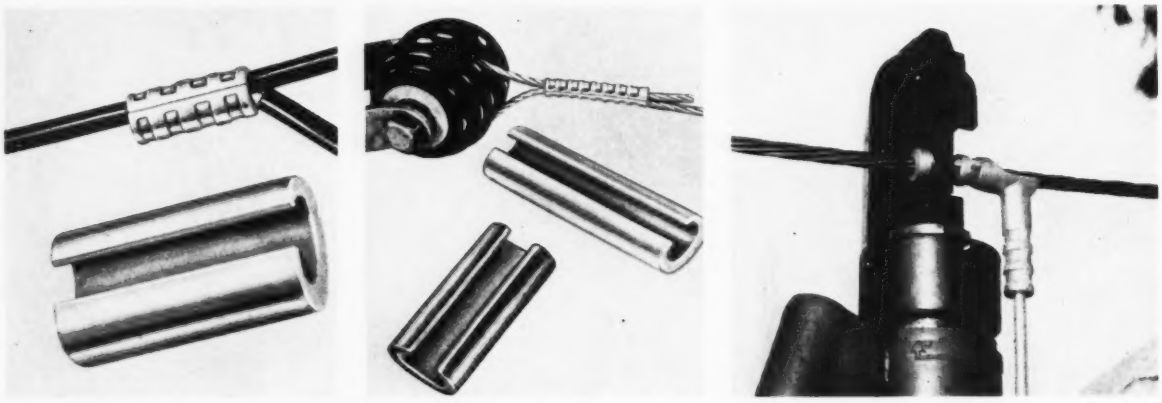
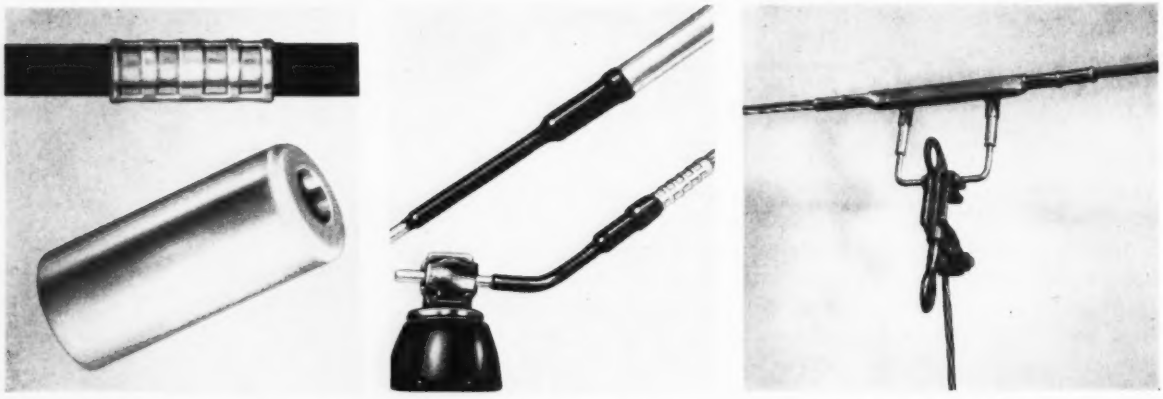
IN OVER 100 PRINCIPAL CITIES

PRODUCT NEWS



CRIMPITS for conductors through 4/0; CRIMPIT DEADENDS for secondaries and service; ELTAPS are for tap applications



LINKITS for service entrance applications; BYTAPS for aluminum and copper; STIRRUPS for hot-line tapping make up . . .

New Line of Compression Connectors for Overhead Distribution

(1) Burndy Engineering Co. Inc., Norwalk, Conn.

This line of six compression connectors was designed for quick installation and to meet most distribution requirements, including connections of aluminum to copper; aluminum to aluminum; and copper to copper. According to the manufacturer, pressures of about 50,000 psi, applied by either of two matching tools, establish permanent, stable connections that are subject to minimum corrosion when properly installed.

Features of the connectors and application tools:

Crimpits, shaped in a figure C, with heavy-walled construction, slip over conductors; are made of aluminum for aluminum conductors and of copper for copper conductors in sizes through No. 4/0.

Crimpit Deadends are made of aluminum or copper for use on secondaries and service deadends. They also are C-shaped to facilitate installation on No. 6 through No. 2 aluminum, copper or ACSR conductors.

Eltaps are made of aluminum and are for tap applications of copper, aluminum, ACSR or any combination of these conductors. They are claimed to inhibit galvanic corrosion; come in the distribution conductor sizes.

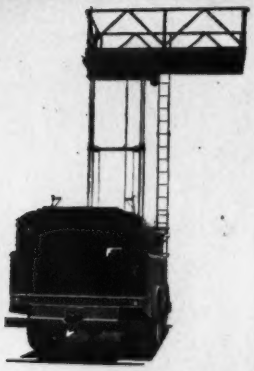
Linkit tubular aluminum compression splices are for service entrance applications of copper, aluminum, or a combination. They are filled with compound by the manufacturer and come in sizes No. 6 through No. 2.

Bytaps, made of aluminum and copper, are for connecting aluminum to copper or copper alloys and aluminum to copper equipment taps. Galvanic corrosion is inhibited, according to the manufacturer, by a factory-bonded aluminum to copper joint, covered with a weather-resistant plastic and bonded to metallic surfaces. Compression elements will take No. 6 through No. 2 aluminum or ACSR.

Stirrups, made by a process similar to that required for the Bytaps, are for hot-line tapping of aluminum or

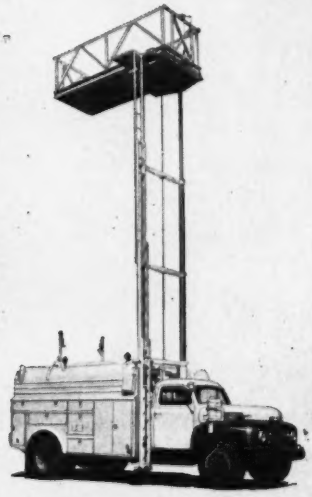
(Continued on Page 58)

POWERS American AERIAL EQUIPMENT



AERIAL TOWERS

Series 7A-01 . . . in sizes for safe, smooth elevation to 21′ or 25′. Equipped with telescopic ladder. Operation from cab or tower. Platform revolves 360°.



HYDRAULIC AERIAL TOWERS

Series TW-2 . . . enables workmen to reach areas more than 35′ above ground. Can be operated from tower or truck cab. Platform revolves full 360°. Telescopic ladder is standard equipment.

REVOLVING Fully-Powered HYDRAULIC AERIAL LADDERS

Series HL-35 . . . elevates, extends, lowers, and retracts by *hydraulic power*. Available in sizes having ground-to-platform height up to 35′. Revolves full 360°.

REVOLVING AERIAL LADDERS

Series 5510 . . . perfectly balanced to permit fast, easy elevation. In sizes having 23′6″, 26′6″, and 30′6″ ground-to-platform height. Can be spotted at angles from 30° to 75°, and revolved full 360°.

HINGED LADDER RACK ASSEMBLIES

Standard and special racks, with extension ladders, can be furnished for installation on Powers-American bodies. These include racks with standard 24′ ladders, and racks with braced or trussed ladders to reach heights up to 30′.

A descriptive bulletin is available on each item of aerial equipment in the Powers-American line. Bulletins, plus prices and complete details, are yours for the asking.

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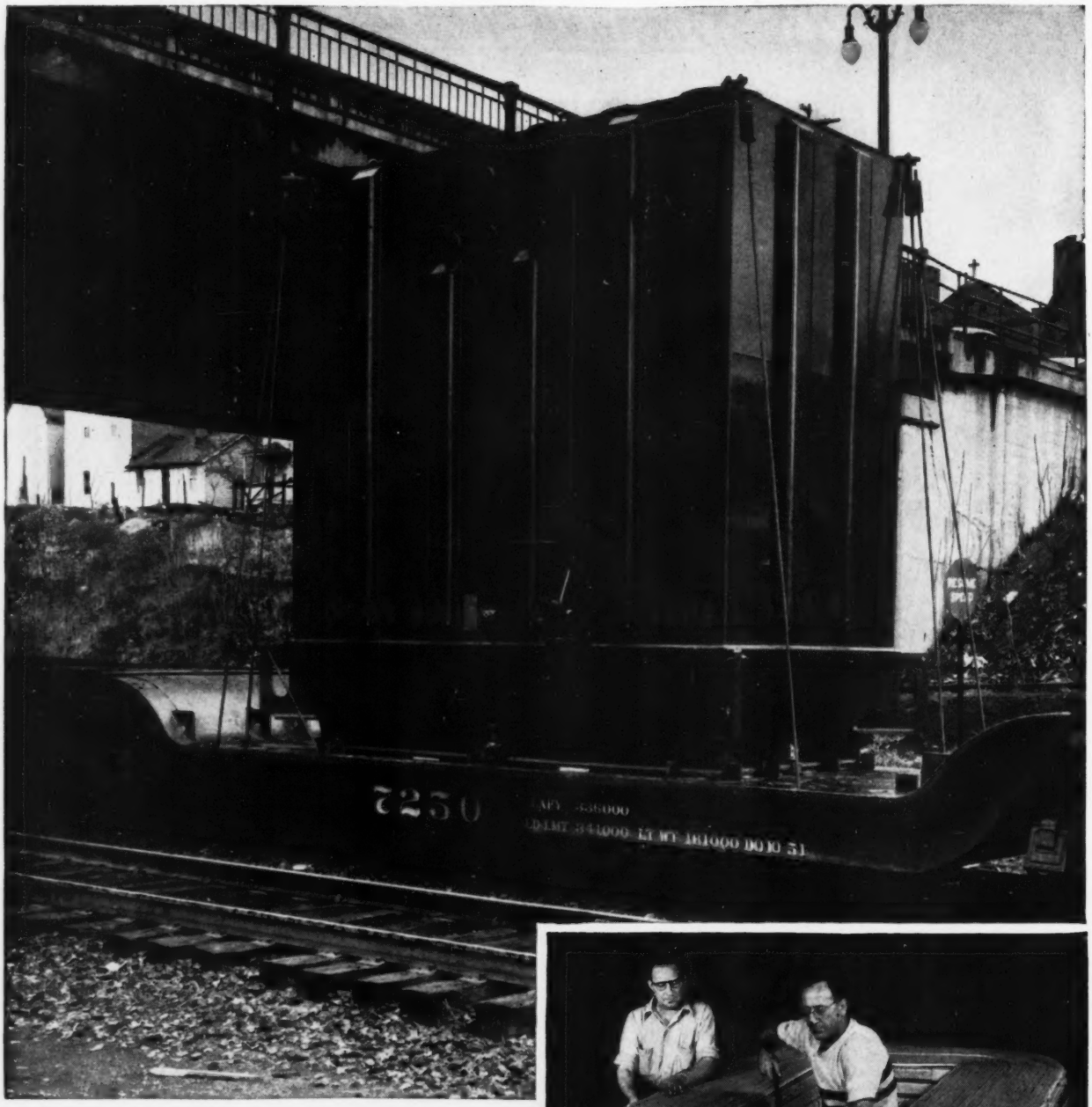


190,000-KVA "FORM-FIT" UNIT enroute to St. Claire Station on Detroit-Edison System . . . the highest capacity unit ever built, but still smaller, physically, than other units on this user's system rated only 145,000 kva!

BETTER SURGE STRENGTH is inherent in "Form-Fit" construction which uses fewer coils of large area. This practice results in greater coil-to-coil and less coil-to-ground capacitance, giving much better surge distribution.

190,000-kva transformer clears low bridge with room to spare!

. . . "Form-Fit" design made it possible

For years, engineers have recognized that shipping facilities were the prime limitation on transformer capacity. Not too long ago, a transformer rated 190,000 kva would have been impossible to transport.

But this record-capacity Westinghouse "Form-Fit" Transformer was shipped in one piece, factory-assembled, from Sharon, Pennsylvania, to Detroit, Michigan. Since no split tank was required, installation was simplified.

Statistically, "Form-Fit" has cut the over-all size of Westinghouse Power Transformers 20%, reduced occupied ground area 15%. These reductions make possible shipment of even greater single unit capacity in the future with corresponding savings in installation time and expense.

In addition, "Form-Fit" transformers will better absorb the shocks of handling and shipping—the stresses of short circuits and electrical surges—without damage. The core surrounds, supports and protects the coils, giving added mechanical and electrical strength. The tank fits snugly over the laminations—braces the assembly still further.

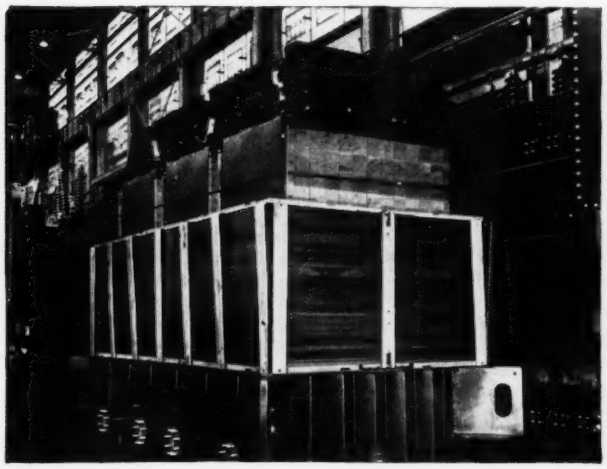
These facts are only part of the story of "dependability at lower cost" offered by Westinghouse Power Transformers. Information on other features like the superior insulation structure, the efficient cooling system, is in the hands of your local Westinghouse representative. He'll be glad to discuss it with you; or write direct for booklet B-4142-A. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa.

J-70679

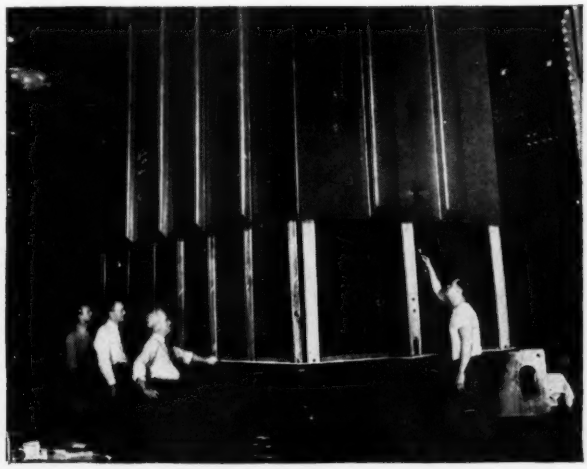
YOU CAN BE SURE... IF IT'S

Westinghouse

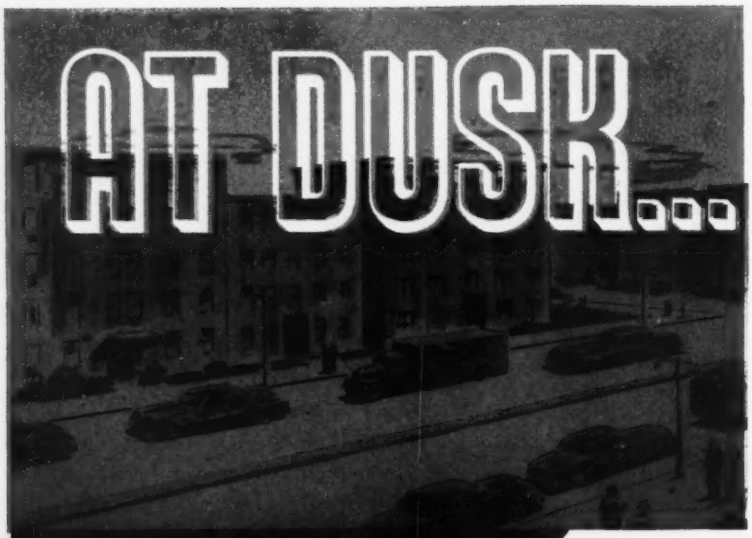
Plants at Berkeley, Calif.; Sunnyvale, Calif.; Emeryville, Calif.; Los Angeles; Portland; Salt Lake City; Seattle; Denver



BETTER MECHANICAL STRENGTH is added to the coil assembly by the Hipersil® laminations, which are clamped by the inside of the tank. Possibility of internal damage from electrical and mechanical forces is greatly reduced.



BETTER THERMAL CHARACTERISTICS are obtained by use of vertical pancake coils. Vertical cooling ducts form natural flues . . . ideal for forced oil cooling without special devices for directing flow.



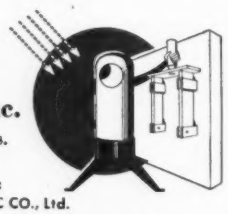
...FISHER-PIERCE
PHOTOELECTRIC CONTROL

When street lighting is controlled by Fisher-Pierce, lights *automatically* turn on the instant that natural light intensity falls below a safe level . . . regardless of time of day, season, climate or weather conditions. And, at dawn, lights remain on until natural light is sufficient for safety. No matter how modern your street lighting is, it is not adequate unless the lights are *on whenever natural light is insufficient for safety and protection.*

Fisher-Pierce Photoelectric Controls have been proven by the experience of hundreds of utilities — proven for performance, for technical operating features and for true economy.

When you consider augmenting or modernizing your street lighting, get in touch with Fisher-Pierce. The extensive Fisher-Pierce engineering service organization is at your service.

Write for Bulletin 63300C.



The FISHER-PIERCE CO., Inc.
43 Pearl St., So. Braintree, Boston 85, Mass.

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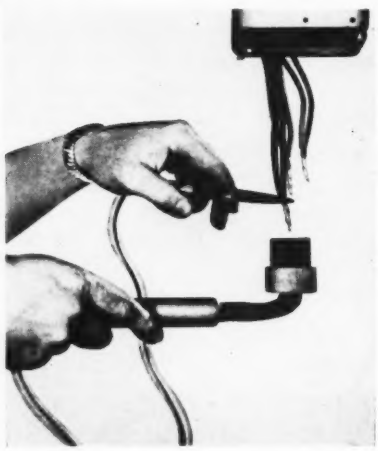
Connectors

(Continued from Page 54)

ACSR runs to copper taps and will take No. 4 through No. 4/0 ACSR and any standard copper Hottap.

Hypress, a hook-headed hydraulic tool, has die sets for making compression connectors on conductors through No. 4/0 copper, aluminum and ACSR. Its hook head allows it to be slipped over connectors without removing dies. The hydraulic system makes possible use of multiple crimp dies. An overload valve controls the tool and a release valve returns ram to open position. The Hypress may be used with hot sticks. Cutting dies to remove connectors are available.

Hytool, claimed to develop greater mechanical advantage than bolt cutters, is a mechanical hand-operated tool with a compound jaw designed for connector sizes through No. 2 ACSR, stranded copper, and aluminum. It is adaptable to hot sticks; has insulated handles.



(2) D-C ARC WELDING system developed by Aluminum Co. of America is demonstrated in this photo. In making welded pigtail joint in covered and insulated aluminum conductor, cover is tripped back and about six turns are made. An aluminum compression sleeve may be used. The joint is grasped near the top with electrode pliers and the weld is made by striking an arc between the wires and the carbon electrode. The manufacturer also has a booklet covering its development activities in arc welding. Details may be secured from Alcoa, Pittsburgh 19, Pa.

Use Coupon, Page 78 to secure manufacturer's literature on these products

BENJAMIN

Versatile "Magna-Flo" SYSTEMS

go to any length to fit your lighting requirements!

Yes, ONE fluorescent lighting system for all three lengths of T12 Slimline Lamps! It's Benjamin "Magna-Flo" . . . so easily adapted to any size area, any type of location found in industry. No matter where you want fluorescent light . . . high ceilings or low ceilings, assembly lines or drafting rooms, lighting for inspection or mass production . . . whatever the seeing conditions and requirements of the task, there's a "Magna-Flo" System to fill the need exactly. As shown by the chart below "Magna-Flo" is really complete . . . yet so simple to order and specify, because just three channel sizes and four basic reflectors form the backbone of over 300 different fluorescent lighting systems!

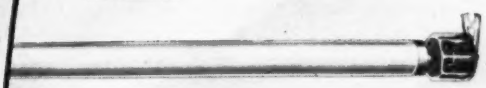
Write for Bulletin AD 5705 for complete specification data on Benjamin "Magna-Flo" . . . see how it goes to any length to suit your fluorescent lighting needs!

"MAGNA-FLO"

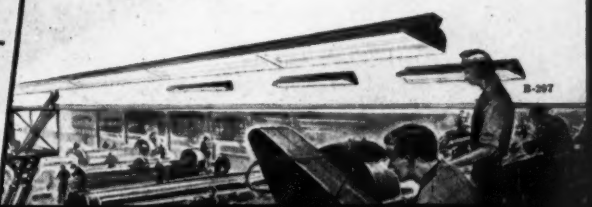
3 BASIC CHANNELS	48"	72"	96"	
4 REFLECTORS	OPEN-END	CLOSED-END	OPEN-END W/APERTURES	CLOSED-END W/APERTURES
3 LENGTHS OF T12 SLIMLINE LAMPS	48"	72"	96"	
2 LAMP HOLDERS	2-LAMP "SPRINGLOX"		3-LAMP "SPRINGLOX"	
2 TYPES OF UNITS	INDIVIDUAL		CONTINUOUS LINES	
4 ACCESSORIES	LOUVERS	PLASTIC COVERS (48" only)	GLASS COVERS (48" only)	SHIELDS
6 TYPES OF SUSPENSION	CHAIN	CONDUIT	CABLE	SINGLE-ROD / CEILING / TWIN-ROD

Sold exclusively through electrical distributors.

A Product of Benjamin Electric Mfg. Co., Dept. J. Des Plaines, Ill., makers of famous Benjamin and Leader Line Lighting Equipment and Sound Signals for Industry, Institutions and Commerce.



BENJAMIN "Springlox"—the exclusive "easy-in easy-out" lampholder which reduces maintenance costs and re-lamping time with a patented spring design . . . "Springlox" is standard equipment with all "Magna-Flo" units.



B-397

Plier for Cutting Filaments

(3) Mathias Klein & Sons, 3200 Belmont Ave., Chicago 18, Ill.

A plier developed for cutting tungsten filaments, music wire, springs and other hard wire operates on a shearing principle that eliminates need for regular cutting knives. No adjustment or sharpening is required even if accidentally nicked, the manufacturer states. A replaceable tempered steel spring keeps the plier in open position ready for immediate use.

The new plier is forged from high-grade tool steel, fitted, tempered, adjusted and tested. Over-all length is approximately 5½ in.

Catalog numbers are 053-L for plier with leaf spring and 053 for plier without leaf spring.

Metallic Tubing

(4) National Electric Products Corp., Gateway Center, Pittsburgh, Pa.

Xduct Junior is an electrical metallic tubing with a bright outside surface claimed to have unusual resistance to corrosion and inside surface said to give minimum resistance for wire pulling.

According to the manufacturer, a new electrogalvanizing process assures a superior, uniform, unbroken zinc coating over the entire exterior. An end-suspension technique has replaced the conventional electrogalvanizing method for depositing zinc, it is stated. A further process, which includes a brightening agent, adds to corrosion resistance and gives a metallic finish approaching stainless steel in appearance. The zinc coating is said to adhere to the steel without flaking or cracking.

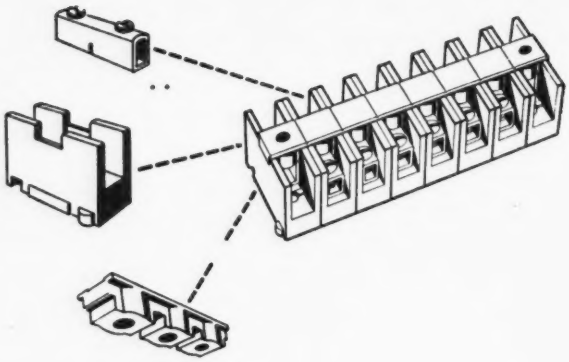
The inner surface has a complete covering of a newly developed aluminum enamel claimed to assure minimum friction when fishing wires and cables through the tubing.

The new E.M.T. is said to bend readily without excessive pressures. When properly bent it will not flatten or spring back. It is available in 10-ft lengths of standard diameter sizes ranging from ½ through 2 in. Connectors and coupling matching the tubing in strength, appearance, finish and corrosion resistance also are available, according to the manufacturer. Tubing and fittings are UL approved.

Plastic Core for Wire Rope

(5) Irvington Varnish & Insulator Co., Irvington 11, N. J.

A plastic core for wire rope of specially formulated plasticized vinyl chloride material is designed for oil and gas well drilling. The vinyl core is highly resistant to acids, alkalies, alcohols, brine, aliphatic hydrocarbons and other subsurface substances, the manufacturer states.



Molded Terminal Block

(6) Ilsco Copper Tube & Products Inc., Mariemont Ave., Cincinnati 27, Ohio

Users can build their own terminal blocks in various lengths and combinations up to 25 poles with a new device called Lok-A-Blok. This new-type terminal block is said to be sturdy, compact and to have excellent electrical and physical properties.

It consists of three parts that can be assembled in a short time without tools. They are: red Lok-A-Bloks that house the solderless connectors; the connectors; a yellow Lok-Strip that holds the assembly together and acts as an identification strip. A hand tool is available to ream the necessary holes for mounting. The top is of a special matte finish that enables the user to mark identifying numbers in pencil, ink or other method.

Lugs or connectors are made of 100% pure electrolytic copper, the manufacturer states. On live metal parts the device has a clearance over surface of ¾ in. and through air of ½ in.

UHF-VHF Line

(7) Anaconda Wire & Cable Co., Hastings-on-Hudson, N. Y.

Foamed Polyethylene, a new form of low-loss insulation, is incorporated in an all-weather, all-channel UHF-VHF line known as ATV-270 Foam. According to the manufacturer, only a skilled hand and a penknife are needed to terminate the line, which has a one-piece cellular construction designed to eliminate internal moisture condensation.

The line consists of two high-strength conductors enclosed and accurately spaced within the new compound, it is stated.

See Coupon on Page 78

For manufacturer's bulletins on these products, fill in and mail the coupon on page 78

READ THIS AMAZING

Pin Type Insulator

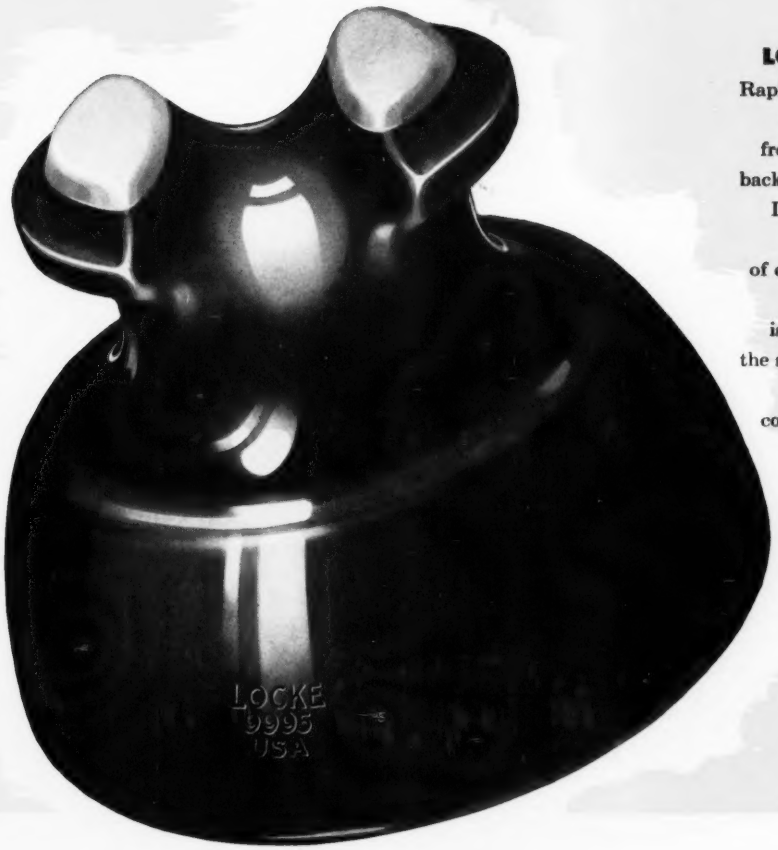
Service Record Report

from the

Henry Oestreich, Constr. Supt.
Black Hills Power and Light Company
Rapid City, South Dakota, says—

"Locke Pin Type Insulators so good we re-used them, even after 47 years continuous service ... at Rattlesnake Jack 'n Kickin' Horse gold mines!"

"Nobody knows how long they'll last", says Henry Oestreich, of Black Hills Power & Light Company, (at right), to Locke's Ed Moore as they inspect a 47 year old Locke Pin Type insulator at mouth of gold mine shaft near Deadwood, South Dakota. Henry has two ambitions . . . one, to maintain high standards of construction . . . the other, to lead his 28 man heavy construction line crew to a new safety record.



LOCKE'S ED MOORE reports from Rapid City, S. D., "In the Black Hills of South Dakota temperatures can zoom from 20° below zero to 60° above—and back again in 10 minutes! The ability of Locke Pin Types to withstand such thermal changes over a 47-year period of continuous, uninterrupted service reflects the supreme quality which is built into *all* Locke Insulators—from the smallest spool to the largest bushing. No wonder leading utilities place their confidence in Locke Insulators."

"You can't beat that for insulator performance," says Henry Oestreich, as he relates the facts of this amazing service record to Ed Moore.

Says Henry: "Back in 1905 my company put in lines to the Rattlesnake Jack'n Kickin' Horse gold mines.

"They're over in the Black Hills . . . right outside of Deadwood.

"That's the town where Jack McCall killed Wild Bill Hickok with a shot in the *back* of the head while Wild Bill was looking the other way . . . at his poker hand. And, it's where an old gal named Poker Alice took the boys real good at faro in the bar of the old Bodega cafe.

"Anyway, these lines to the Rattlesnake and Kickin' Horse stayed in continuous service 'til early last year when they were torn down.

"None of the material used to build those lines was of any value . . . except these Locke Pin Types which had been in continuous service since 1905. That's 47 years—the way I make it.

"They looked so good we checked 'em over, cleaned 'em up a little and decided to re-use 'em rather than junk 'em. So they're now in service again on the re-build of our Pluma-Nemo 12 kv line.

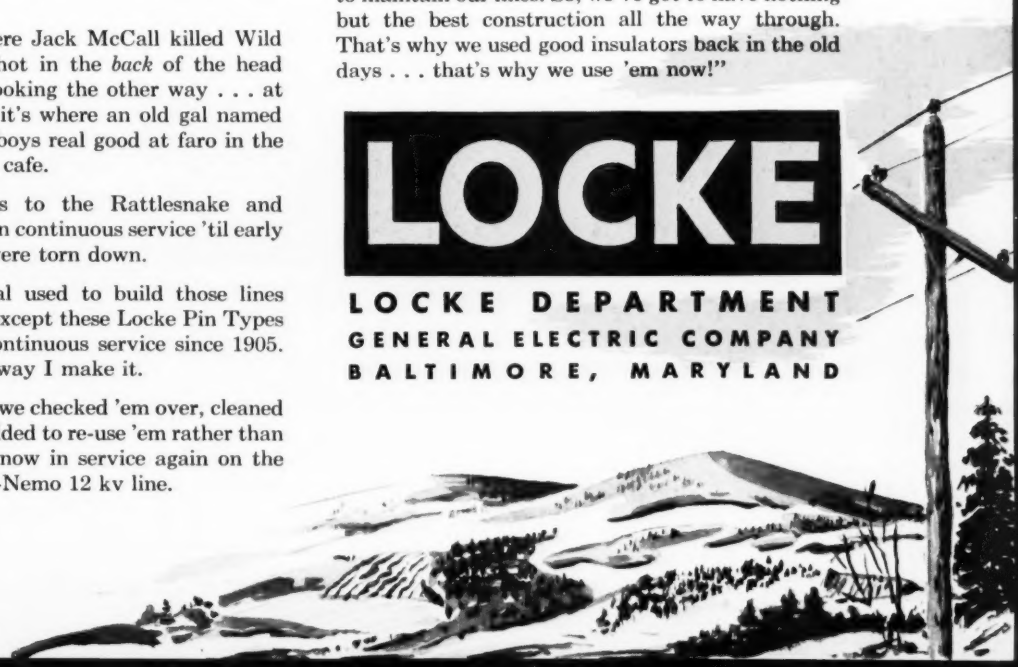
"But that's not the whole story. If you looked around our system you'd find a lot more of these old Locke Pin Types still in service on some of our company's original lines which are still in existence.

"You can't beat that for performance, can you?

"But it's the kind of performance we've got to have," says Henry, " 'cause during the winter it's tough to get through the snows up there in the Hills to maintain our lines. So, we've got to have nothing but the best construction all the way through. That's why we used good insulators **back in the old** days . . . that's why we use **'em now!"**

LOCKE

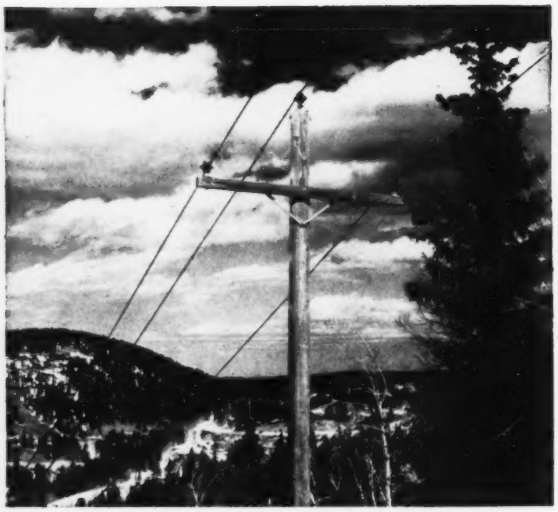
LOCKE DEPARTMENT
GENERAL ELECTRIC COMPANY
BALTIMORE, MARYLAND



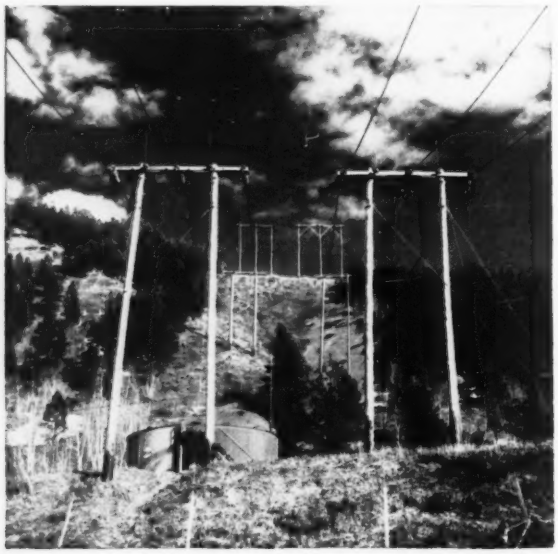
Typical Operating Conditions

of Black Hills Power and Light Company, with headquarters in Rapid City, South Dakota

In mountain and prairie areas served by the Black Hills Power and Light Company, temperatures can drop from 60° above to 20° below zero . . . in ten minutes. Obviously, only the finest equipment can withstand such drastic thermal changes. Locke Pin Types have been doing just that for 47 years!



12 kv line stretching east from Terry Peak, famous ski resort 6,500 feet high in South Dakota's original hunting grounds of the Sioux Indians—the Black Hills. All three insulators in foreground are Locke Pin Types . . . put in service in 1905 . . . and still on the job!



69 kv line from company's Deadwood plant to Custer, South Dakota, 60 miles away, and to Osage, Wyoming, about 50 miles. Note combination of two-pole deadend, two-pole suspension and three-pole deadend. Many holes had to be dynamited seven feet into solid rock . . . a typical example of construction difficulties encountered in the Black Hills.

These are examples of the rugged terrain and tough climate under which Locke Pin Type Insulators established a 47 year record of continuous service—probably an all-time record!

No wonder leading utilities put their confidence in LOCKE Insulators.

For many years Contractors from Coast to Coast have used Briegel All Steel Indenter Fittings. U. L. approved as concretetight and for general use, B-M Indenter Fittings are faster, easier to use and neater in appearance.

Installation is simple and less expensive. Two quick squeezes sets them forever. Try B-M Indenter Fittings and get more profits from each job!

UL

TELESCOPE BM SYSTEM

BRIEGEL METHOD TOOL CO.

GALVA, • ILLINOIS

the Best
in safety...
wearability
KLEIN-KORD

Count on being really satisfied with Klein-Kord *nylon* Safety Straps. They're smooth and flexible, require no special care—and give you that important extra margin of safety. Made of multiple plies of strong, finely woven *nylon*, bonded together with frictioning and vulcanized in neoprene. Red center is a safety signal to "Stop When You See Red!" Equipped with finest drop-forged hardware.

ASK YOUR SUPPLIER

Foreign Distributor:
International Standard
Electric Corp., New York

KLEIN *Nylon* CLIMBER STRAPS
for calf and ankle also available. Special straps furnished with rivets, burrs and punched for quick attachment to ring type climbers.

Write for your free copy of the Klein Pocket Tool Guide today!
"Since 1857"

Mathias Established 1857 KLEIN & Sons Chicago, Ill., U.S.A.
3200 BELMONT AVE. CHICAGO 18, ILL.

Reclosing Relay

(8) Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

An automatic reclosing relay with a built-in instantaneous trip lockout feature is intended primarily for controlling the reclosing operation of a circuit breaker. This RC relay will prevent repetitive tripping from the action of the instantaneous trip of the protective relay, it is pointed out.

Additional external terminals provide connection to internal coils and contacts of this redesigned relay to permit its application to all types of circuit breaker control schemes, the manufacturer states. Adjustable reclosing time sequences of 60, 90, 180 or 360 seconds are provided by a 600-rpm synchronous motor with a gear train of adjustable ratio. The relay also may be obtained with an adjustable integrating lockout device that limits successive circuit breaker reclosures to a safe value.

The RC comes in a standard rectangular projection case or in a Flexitest case of the semiflush or projection style.

Insulation

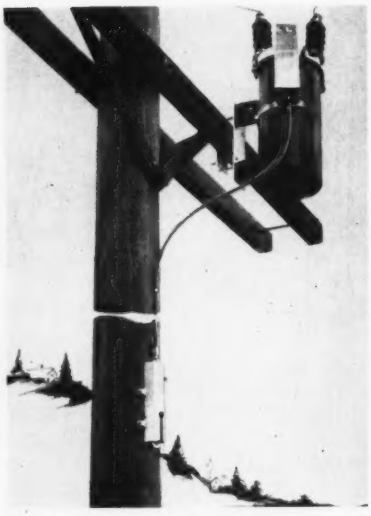
(9) General Electric Co., Laminated and Insulating Products Department, Pittsfield, Mass.

The manufacturer's SE-100 silicone rubber coating compound has replaced the silicone material formerly used on its 76510 silicone rubber-coated glass cloth tapes and wrappers.

It is stated that this glass cloth is able to give heavy electrical equipment a flexible insulation that overcomes cracking problems inherent in brittle resin products. The new formulation enables the insulation to be bent easily over a ⅛ mandrel at minus 60 C but the coating does not soften or flow at 315 C, according to the manufacturer. Tensile strength is 130 lb per inch of width. Water absorption is .85% after 96 hours of immersion.

This product comes in widths up to 36 in. and in a thickness range from 7 to 17 mils. The 10-mil grade has a typical dielectric strength (IPCEA method) of 1,200 v per mil at room temperature and 1,175 at 85 C. Sixty cycle power factor at 100 C is .72%.

(10) GLOVE TESTER—The new Hanco glove tester measures the dielectric strength of rubber and synthetic gloves used in the electrical field; comes in 4-, 6-, 8- and 10-glove models; is claimed to meet specifications of the American Society for Testing Materials. It has a capacity of 50,000 v; may be manually or automatically controlled. Made by F. R. Hannon & Sons, 1605 Waynesburg Rd., S.E., Canton, Ohio.



Remote Control for Oil Circuit Recloser

(11) James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo.

A remote control for use with most makes of 15- and 25-kv single-phase reclosers without necessity of recloser changes or disassembly allows opening or closing from the ground in less than 30 seconds. According to the manufacturer, it eliminates the danger of personal injury to the lineman; is available with 10-, 15-, 20- or 25-ft length flexible control shaft, ready for field installation.

The remote control handle housing is slotted as a precautionary measure. This allows simple, easy operation with a switch stick but prevents hand operation, the manufacturer states.

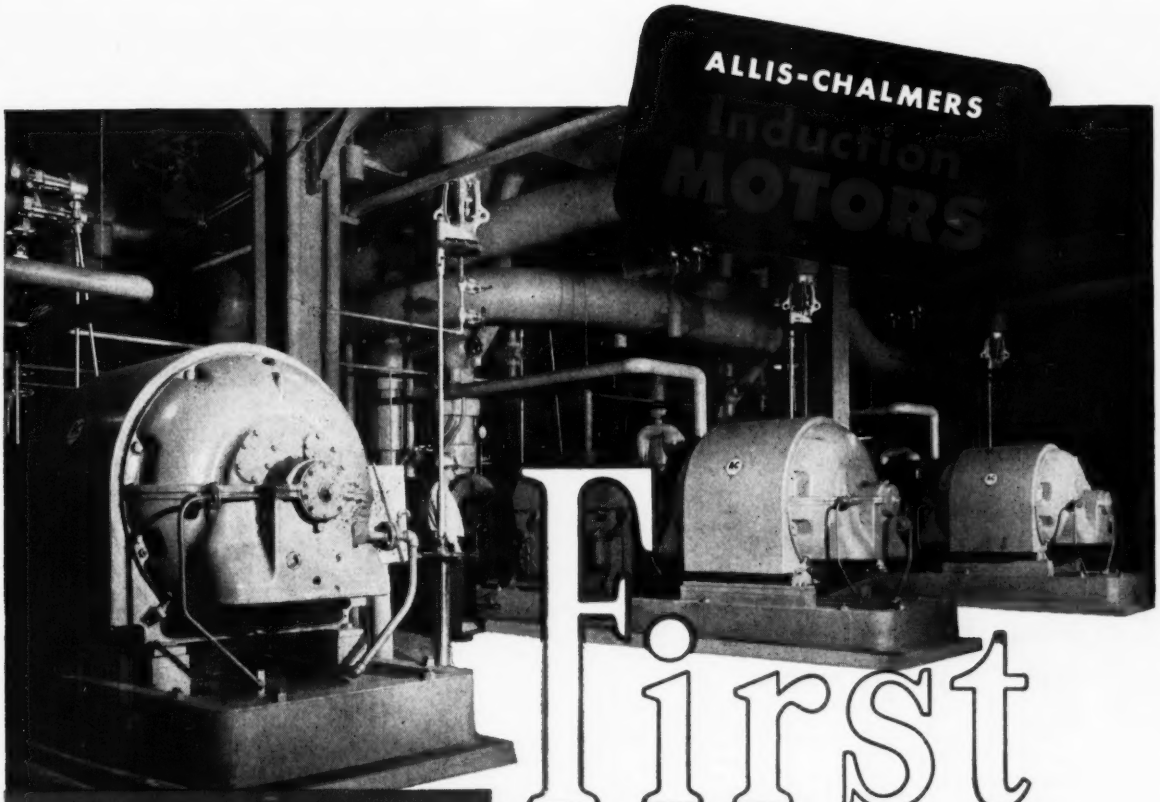
Voltmeter

(12) All Mail Sales Co., 100 Park Place, New York 7, N. Y.

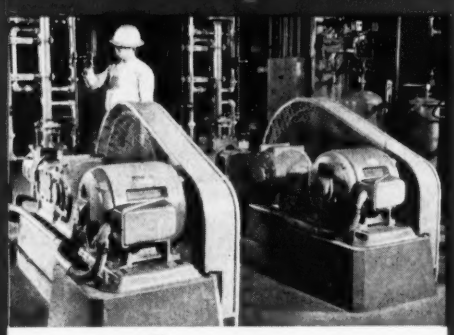
Model 640 Meg-Ohm voltmeter gives a 500-v d-c source for insulation testing by means of a hand crank generator. The unit can measure up to 200 megohms and has provisions for resistance testing from 0 to 2,000 ohms. A-c voltages are read on three ranges: 0-150; 0-300; 0-600. D-c voltages are metered in the same ranges.

(13) RESIN—A new vinyl resin, designed for dry blend feed of extruded products, has been developed by the Naugatuck Chemical Division of United States Rubber Co., Rockefeller Center, New York 20, N. Y. It is known as Marvinol VR-22.

(14) OUTLET—A duplex outlet called Fuse-O-Let comes with two UL-approved fuses; is made with phosphorus bronze contacts. Product of Alvin Mfg. Co., 1800 Eddy St., Chicago 13, Ill.



First OF THREE TRIPLETS



Suggested

INDUCTION MOTOR BULLETINS

Drip-proof and splash-proof (End-shield bearing)	½ — 100 hp	51B6210
	15 — 800 hp	51B7693
	60 — 1750 hp	05B7542
Totally-enclosed fan-cooled (End-shield bearing)	½ — 100 hp	51B7225
	40 — 800 hp	51B7149
	125 — 3000 hp	05B7150
Two-pole — 900 hp and larger		05B7550
Large vertical		05B7629
Large pedestal-bearing		05B7771
Totally-enclosed water-cooled		05B7682
Weather-protected, for outdoor use		05R7874

These three 1500-hp, 3580-rpm boiler feed pump motors are the first of three such sets due for installation at Cincinnati Gas & Electric's Walter C. Beckjord station.

Large or small, the auxiliary drive motors for all three generating units at this new station will be Allis-Chalmers designed and built. The fact is, Cincinnati Gas & Electric learned thirty years ago that you can depend on A-C for reliable power plant auxiliary drives.

You can get auxiliary drive motors engineered to fit your requirements by calling in your A-C representative early in the planning stages. For design details, ask for the bulletins listed at the left. Allis-Chalmers, Milwaukee 1, Wisconsin.

A-4058

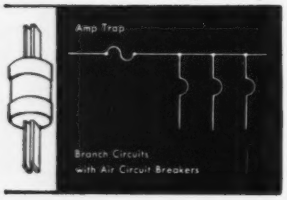
ALLIS-CHALMERS

A-C ALLIS-CHALMERS

Amp-trap®

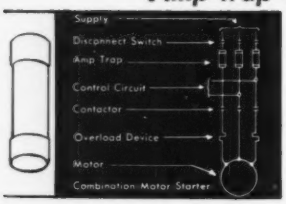
CHOPS DANGEROUS SHORT-CIRCUITS DOWN TO SIZE

Amp-trap with CIRCUIT-BREAKERS



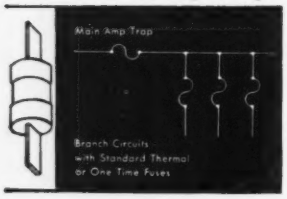
Amp-trap's lightning fast current limiting action makes it ideal for use in locations where the available short circuit current exceeds the circuit breaker's interrupting rating. It gives back-up, short-circuit protection to overload devices and clears a heavy short-circuit before the circuit breaker can open. Yet, the circuit breaker will open within its rating without blowing the Amp-trap.

Amp-trap with MOTOR CONTROLLERS



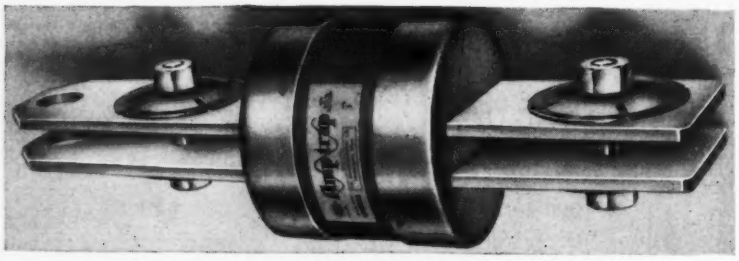
Amp-trap's small "let-through" current (low I^2t) gives positive protection to over current devices and contacts against high thermal or magnetic stress caused by super currents as high as 100,000 amperes R.M.S. at rated voltage. Amp-trap's operating characteristics limit stress on motor controllers, conductors, panel boards and load centers.

Amp-trap with PLUG-IN BUSWAY



Amp-trap's fast "chop-off" on high amperage short-circuit gives short-circuit protection to ordinary fuses and to isolate branch circuits without affecting feeder circuits or other branches supplied from the main busway. Actual tests on high short-circuit current have shown how Amp-trap amplifies plug-in busway momentary ratings by limiting magnetic and thermal stresses, and permits application of designs having limited withstanding ability on high powered installations.

Amp-trap is safe, efficient, economical short-circuit protection for electrical apparatus against large available short-circuit currents.



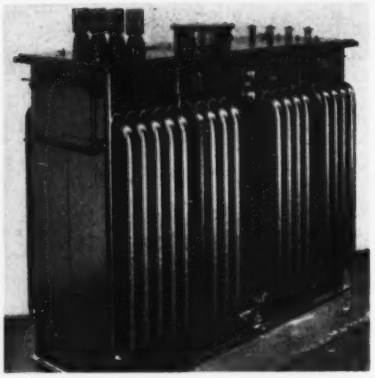
OUR 60 IN YEAR — FROM EDISON TO ELECTRONICS

AMP-TRAP — "Awake At The Switch"

In Canada — Powerlite Devices, LTD.

THE CHASE-SHAWMUT CO.

385 MERRIMAC STREET • NEWBURYPORT, MASSACHUSETTS



Distribution Transformer

(15) Pennsylvania Transformer Co., P. O. Box 330, Canonsburg, Pa.

The manufacturer's new Power Pac assembly consists of a single tank containing standard distribution transformer core-and-coil assemblies. It is designed for single- or multiple-customer service with provisions for metering.

The assembly can be supplied for three-phase service or for a combination of three-phase and single-phase service. It comes in three phase, 150, 225 and 350 kva and in the combination with ratings of 100 and 200 kva. It may be installed in building, in sidewalk vaults or outdoors.

The photograph shows the 300-kva three-phase assembly.

Autotransformer Dimmer

(16) Ward Leonard Electric Co., Mount Vernon, N. Y.

The Varistat is designed for controlling intensities of low-capacity lighting circuits found in school stages, churches, homes, night clubs and restaurants.

It is a continuously adjustable autotransformer mounted on a light cast alloy base for convenient installation. It is 2,000 w, 110-120 v 60 cycles, continuous duty, with operating torque of 30 to 60 in. oz. Net weight is 15 lb.

Noninterlocking Varistats come in single or multiple assemblies, mounted front or back of panel. Interlocking types come in various mounting frameworks and as remote control motor-operated units.

(17) **FLASHLIGHT** — The Duo-Flex, an industrial flashlight with a patented built-in dual lighting system, gives a probe light for pinpoint inspection and a 1,000-ft flashlight beam. Made by U. S. Electric Mfg. Corp., 222 W. 14th St., New York City 11, N. Y.

For Bulletins, See Page 78

in 1908

Nichrome*

made electric heat possible!

since then...
The Standard of Quality for Electrical Alloys

When Driver-Harris introduced Nichrome* in 1908, *dependable* electric heat became possible for the first time. And with each passing year, Nichrome looms larger as the *ideal* alloy for producing electric heat in domestic and industrial equipment.

Its consistent dependability and unique performance have earned it a world-wide reputation—and made it *the* standard of quality for electrical alloys. That's why today, the great majority of heating elements of all types—in applications ranging from electrical home appliances to large industrial furnaces—are made of this excellent alloy.

Naturally, we take particular pride in our trademark: Nichrome—granted solely and wholly to us by the United States Patent Office forty-five years ago. Representing a series of superb heating and resistance alloys, developed and produced *only* by Driver-Harris, this trademark symbolizes *long life* and *trouble-free* operation to manufacturers everywhere.

Sole producer of Nichrome®, Advance®, Karma® and over 80 other alloys for the electrical, electronic and heat-treating industries.

*T.M. Registered in United States Patent Office by Driver-Harris Company August, 1908

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Driver-Harris Company

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BRANCHES: Chicago, Detroit, Cleveland, Los Angeles, San Francisco

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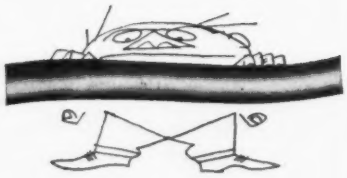
Factories: U.S.A., CANADA, ENGLAND, IRELAND, FRANCE, ITALY, SPAIN Representatives in 38 COUNTRIES

MAKERS OF THE MOST COMPLETE LINE OF ELECTRIC HEATING, RESISTANCE AND ELECTRONIC ALLOYS IN THE WORLD

go ahead and be a brute!



you don't have to baby

BRONCO 60 *Certified* portable cords and cables

Don't worry about oil, acids, alkalies... BRONCO 60 Certified has a jacket rich in oil and chemical-resistant Neoprene. It is certified to contain not less than 60% Neoprene by weight.

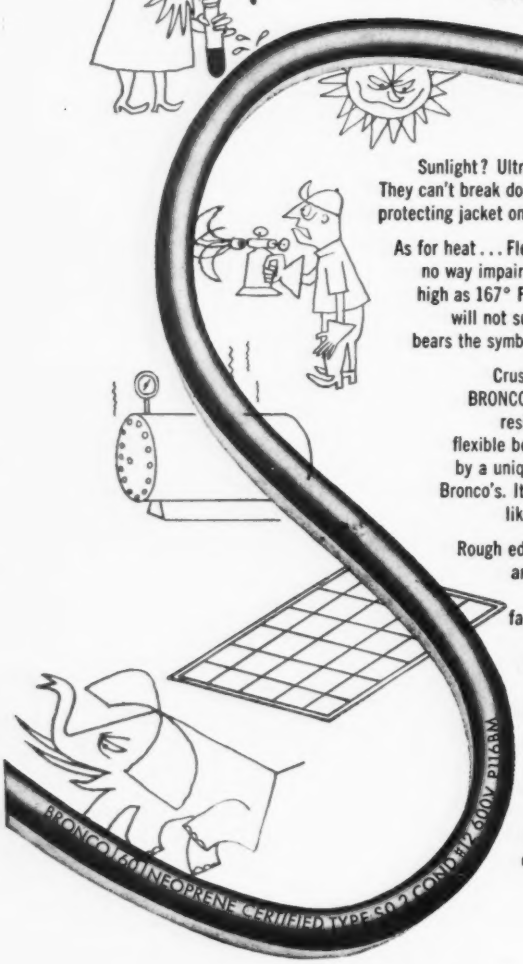
Sunlight? Ultra-violet rays? Ozone? They can't break down the 60% Neoprene protecting jacket on BRONCO 60 Certified.

As for heat... Flexibility and life are in no way impaired by temperatures as high as 167° F. BRONCO 60 Certified will not support combustion and bears the symbol P116BM to prove it.

Crushing holds no terrors. BRONCO 60 Certified is extra-resilient as well as extra-flexible because it is vulcanized by a unique method exclusively Bronco's. It "gives" under impact like a super-balloon tire.

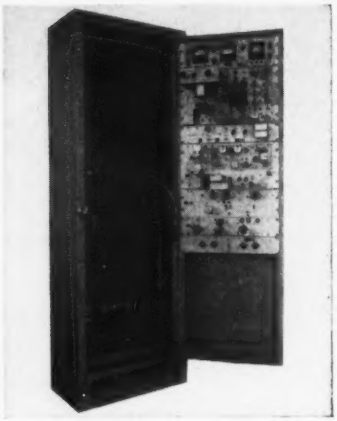
Rough edges and sharp corners aren't much of a threat. In any inhabitable factory the edges aren't rough enough or the corners sharp enough to damage tough BRONCO 60 Certified.

A temporary overload is not likely to harm BRONCO 60 Certified because this cable is built with a generous extra margin of safety — electrical as well as mechanical.



WESTERN INSULATED WIRE CO.
Los Angeles 58, California

Sold nationally by Electrical Wholesale Distributors



Power Line Carrier

(18) Westinghouse Electric Corp., Dept. TP-285, 2519 Wilkens Ave., Baltimore 3, Md.

A new line of carrier equipment, type FD, is designed for power system relaying, telemetering control and voice communication.

One of the features of the new equipment is closer channel spacing, made possible, according to the manufacturer, by highly selective receiver filters and crystal control of frequency. Frequency ranges are 40 to 90 and 90 to 200 kc. Assemblies operate from battery or alternating current.

Circuit Breakers

(19) The Wadsworth Electric Mfg. Co. Inc., Covington, Ky.

The new E-Z-Red line of circuit breakers is available in ratings of 15, 20, 30, 40 and 50 amp and come for surface and flush mounting in from 1 to 20 single-pole breakers. Those with a capacity of four or more breakers may be arranged for combinations of single- and double-pole breaker circuits. Details are in bulletin W.C.B. 53-1.

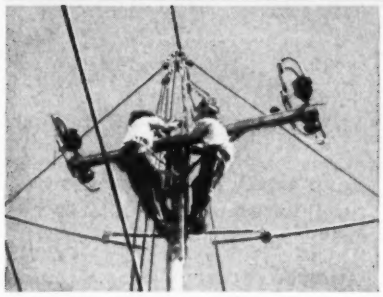
(20) **WEDGE CLAMP**—Reliable Electric Co., 3145 Carroll Ave., Chicago 12, Ill., says that aluminum service cable can be put up and sagged before it is cut with its new 7080 service wedge clamp. This clamp permits attachment to bare neutral of twisted service drop cable at any point in the span, it is stated, and service cable can be cut to exact length with no waste. The device is also suitable for open-wire aluminum service; will accommodate all No. 6 and No. 4 sizes and No. 2 solid.

For Bulletins, Fill in the Coupon on Page 78

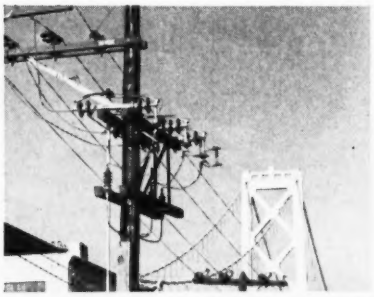
KPF

AIR BREAK SWITCHES

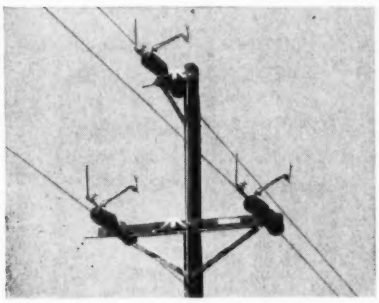
Standard for nearly half a century



Installing KPF Type A-202 switch hot on 12 kv line. KPF phase units are shipped completely assembled, ready for quick installation.

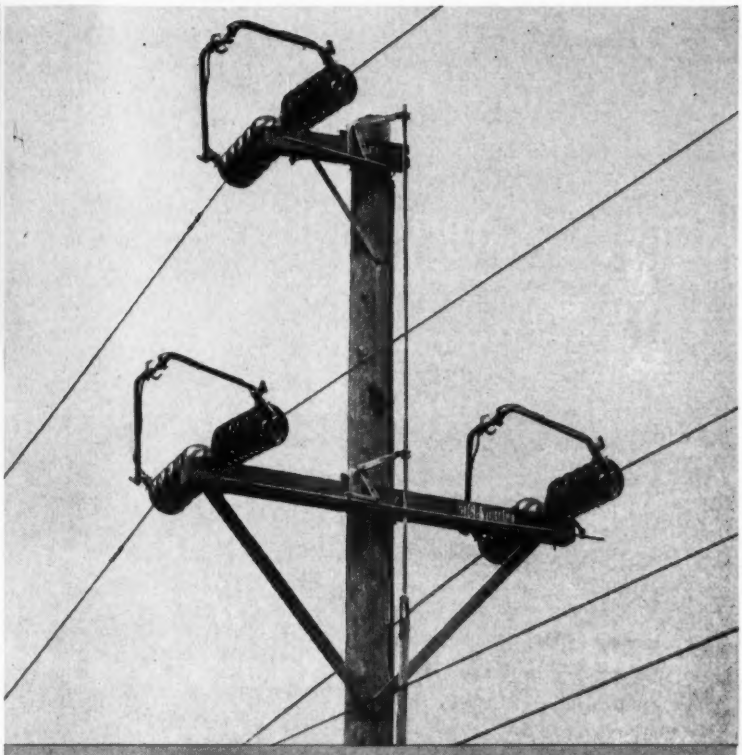


Horizontal-mounted KPF Type UF-2 switch in metropolitan service (P.G.&E., San Francisco). Versatile KPF switches operate equally well with or without line tension.



KPF Type S-205 switches with inexpensive Quick-Break attachment on 60 kv rural transmission line. Switch shown in open position.

2825



Basically different switch design proven in decades of service with leading utilities

Service-proved KPF switches look different because they *are* different.

Their simple, sturdy design insures freedom from mechanical failure or lubrication worries, and virtually eliminates maintenance. Self-aligning silver surfaced blades operate smoothly despite severe ice or crossarm warpage conditions. Installation is fast and economical—switches are bolted directly to crossarms on the ground or in the air. No separate strain insulators or extra crossarms are required; integral insulator stacks readily adjust to line sag.

KPF switches have been used for almost 50 years on lines ranging from 7.5 to 110 kv. Tens of thousands are in use today by Pacific Gas & Electric, Southern California Edison, Minnesota Power & Light and other leading power companies throughout the world.

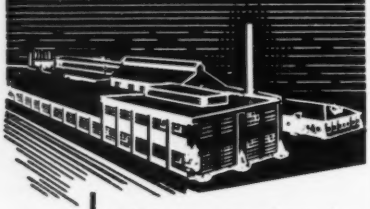
For the world's simplest, surest, lowest cost air break switch, specify KPF—standard for nearly 50 years.

New catalog gives complete specifications, detail drawings, installation information.

KPF ELECTRIC COMPANY

1624 East Alpine Avenue, Dept. W-1, Stockton 5, California

37 year Success Story



In 1916, the year of our beginning, The Ohio Carbon Company was housed in a small building that had 1100 square feet of space. The success with which our product has met has resulted in a large, well equipped plant covering 50,000 square feet of floor space. We firmly believe that our success has been dependent upon our continuous effort to meet customer requirements promptly and to rendering a helpful engineering and design service. Today, thousands of industrial concerns avail themselves of our product and our recommendations. THEY HAVE LEARNED TO DEPEND ON OUR 37 YEARS OF EXPERIENCE IN PRODUCTION AND RESEARCH IN THE LABORATORY AND IN THE FIELD.

ORDER YOUR CARBON BRUSHES FROM A SINGLE SOURCE

West Coast Representative
C. F. BOWERS
544 S. San Pedro St.
Los Angeles 13, Cal.

THE OHIO CARBON COMPANY
12508 BEREA ROAD • CLEVELAND 11, OHIO

Time Switch

(21) Paragon Electric Co., Two Rivers, Wis.

Replacing the manufacturer's 300 series, a completely new 3,000 series Memory Master time switch has been announced.

The Torsion clutch dial drive is said to allow for free movement and to permit manual check of on-off switching operations. Separating day and night, the dial was designed for quick reading. Special dial trippers need only be loosened slightly for resetting and additional trippers may be added without removing the dial to provide for 16 operations per 24-hour period.

The unit is UL approved for 30 amp capacity at 120 or 240 v.

(22) **PROCESS HEAT CONTROL**—An indicating controller featuring anticipating action has been added to the model 200 series Capacitrol line, according to its manufacturer, Wheelco Instruments Division, Barber-Colman Co., Rockford, Ill. This device, through a resistor network and relay circuit, anticipates the approach and departure of temperatures caused by various heat transfer lags and load requirements, it is stated. Bulletin F 5783 gives details.

(23) **CASE**—An improved case for its midget Megger insulation tester has been announced by James G. Biddle Co., 1316 Arch St., Philadelphia 7, Pa. When the lid is flipped back, the instrument is ready for use. Leads are stored in a compartment under the instrument. Details in bulletin 21-85-11.

For More Data Fill in Coupon, Page 78

PYLE-NATIONAL SERVICE ENTRANCE PYLETS

HEADS
CAPS
ELBOWS
CONNECTORS

Entrance Heads

FORMERLY MANUFACTURED BY THE M. B. AUSTIN COMPANY

Another important addition to an extensive and continuously expanding line of high quality, heavy duty wiring and lighting products.

PYLE-NATIONAL'S COMPLETE LINE INCLUDES:

Cable Clamp Caps

Entrance Caps

Entrance Elbows

- Pylet conduit fittings for hazardous and non-hazardous locations.
- Safety switches.
- Circuit breakers.
- Plugs and receptacles, Triploc, Midget Triploc, Quelarc and Strate-Line.
- Push-button and pilot light Pylets.
- Lighting fixtures, explosion-proof, dust-tight, vapor-tight.
- Junction Pylets.
- Cord and cable sealing grips—conduit unions.
- Floodlights and pit lights.
- Loading lights.
- Gyralite visual warning signals.

SINCE 1897

Refer to Bulletin No. 1135 . . . or call your Pyle-National Electrical distributor.

THE PYLE-NATIONAL CO.
1364 North Kostner Avenue
Chicago 51, Illinois

THE RIGHT TAPE FOR HOT SPOTS

(*It belongs in your tool box*)

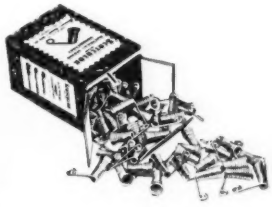
Why risk using an ordinary insulating tape for high-heat application? Use the *right* tape for the job—"Scotch" Electrical Tape No. 27—and save yourself from the danger of insulation failure, costly re-wiring.

Glass cloth backing and thermosetting adhesive make No. 27 tape tough when the heat's on! The backing won't burn, stretch, shrink or rot. The adhesive cures in 1 hour at 300°F to form a permanent bond of great strength—and it *lasts*. Curing increases the dielectric strength about 500 volts.

Order "Scotch" Electrical Tape No. 27 today! And when you're ordering, check your supply of the four other "Scotch" Electrical Insulating Products shown below. Always demand the dependable "Scotch" Brand!

"SCOTCH" Plastic Electrical Tape No. 33 is available in 66 ft. x ¾ in. rolls in individual cans, and "Job Size" Rolls—20 ft. x ¾ in. —packed 12 to a screw-top fibre container that keeps out dust and dirt, prevents bruising.

"SCOTCHFIL" Electrical Insulating Putty is ideal for padding sharp edges on bus bars and connectors. Comes in a roll, applies like tape. Can be moulded with moderate finger pressure to eliminate voids and air pockets. 1½ in. x 5 ft. rolls.

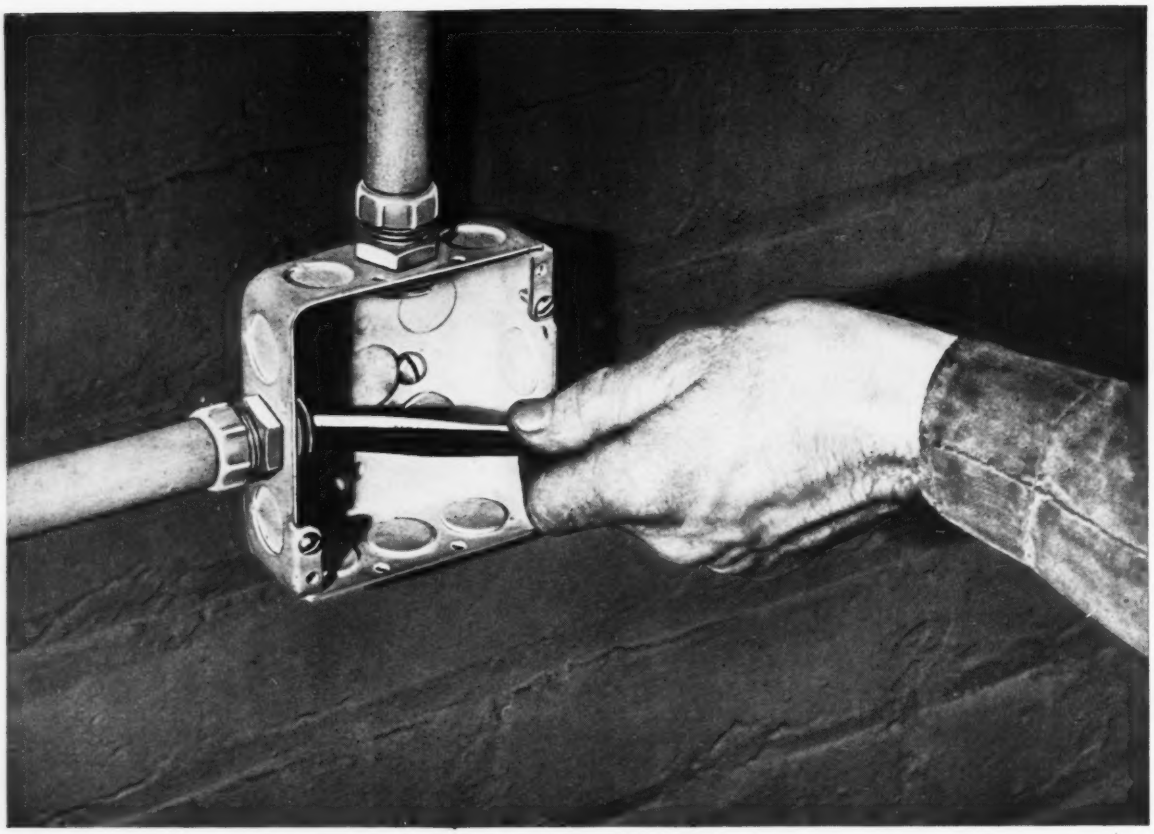


"SCOTCHLOK" Electrical Spring Connectors are a new twist in splicing — both a pressure and a fixture-type connector. One size handles wire combinations from Awg 10 down to Awg 16. Just twist on wires, break off the stem, and wrap with tape.

"SCOTCHKOTE" Electrical Coating is a strong, fast-drying over-coating for taped wire and cable splices subjected to abnormal weathering or moisture conditions. Resists sunlight, soil acids, oil and aliphatic hydrocarbons. 5 oz. tubes.

The term "Scotch" and the plaid design are registered trademarks for the more than 200 pressure-sensitive adhesive tapes made in U.S.A. by **Minnesota Mining & Mfg. Co., St. Paul 6, Minn.**—also makers of "Scotch" Sound Recording Tape, "Underseal" Rubberized Coating, "Scotchlite" Reflective Sheeting, "Safety-Walk" Non-slip Surfacing, "3M" Abrasives, "3M" Adhesives. General Export: 122 E. 42nd St., New York 17, N.Y. In Canada: London, Ont., Can.

SCOTCH BRAND Electrical Insulating Products



For easy wire-pulling use G-E EMT

Wires pull easily through G-E electrical metallic tubing, because Glyptal* lacquer, baked onto the interior surface, produces a smooth, even finish. There are no burrs or rough surfaces to snag or tear insulation. This anti-friction interior really minimizes wire-pulling time.

You'll appreciate these other important features of General Electric EMT, too . . .

Colored wrapping tape tells size at a glance. No more confusion and extra leg-work because of wrong sizes. Just reach for the bundle with the colored wrapping tape that identifies the size you want. The tape keeps bundles firm, too—makes them easy to carry. The tape is easily removed with a stroke of a pocket knife.

Corrosion protection. Controlled electroplating gives G-E EMT a uniform zinc coating for long-lasting corrosion protection.

Easy bending. The high-grade steel used in G-E EMT is specially selected for the proper bending qualities.

Try General Electric EMT on your next job. You'll like the way it simplifies size selection and speeds installation. It's listed by Underwriters' Laboratories, Inc. For more information, write Section C34-1025, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

**Registered Trade-mark General Electric Company*

You can put your confidence in—

GENERAL ELECTRIC

THE RIGHT TAPE FOR HOT SPOTS

(*It belongs in your tool box*)

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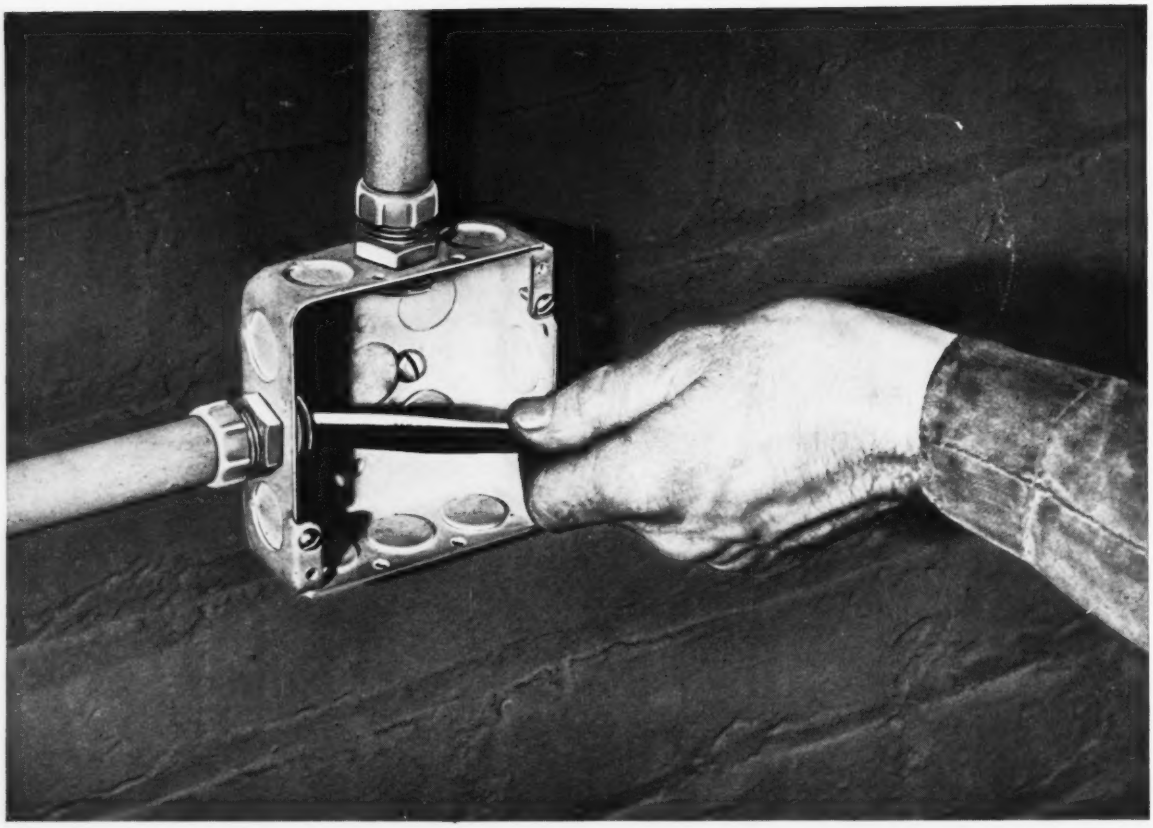
SCOTCH BRAND Electrical Insulating Products



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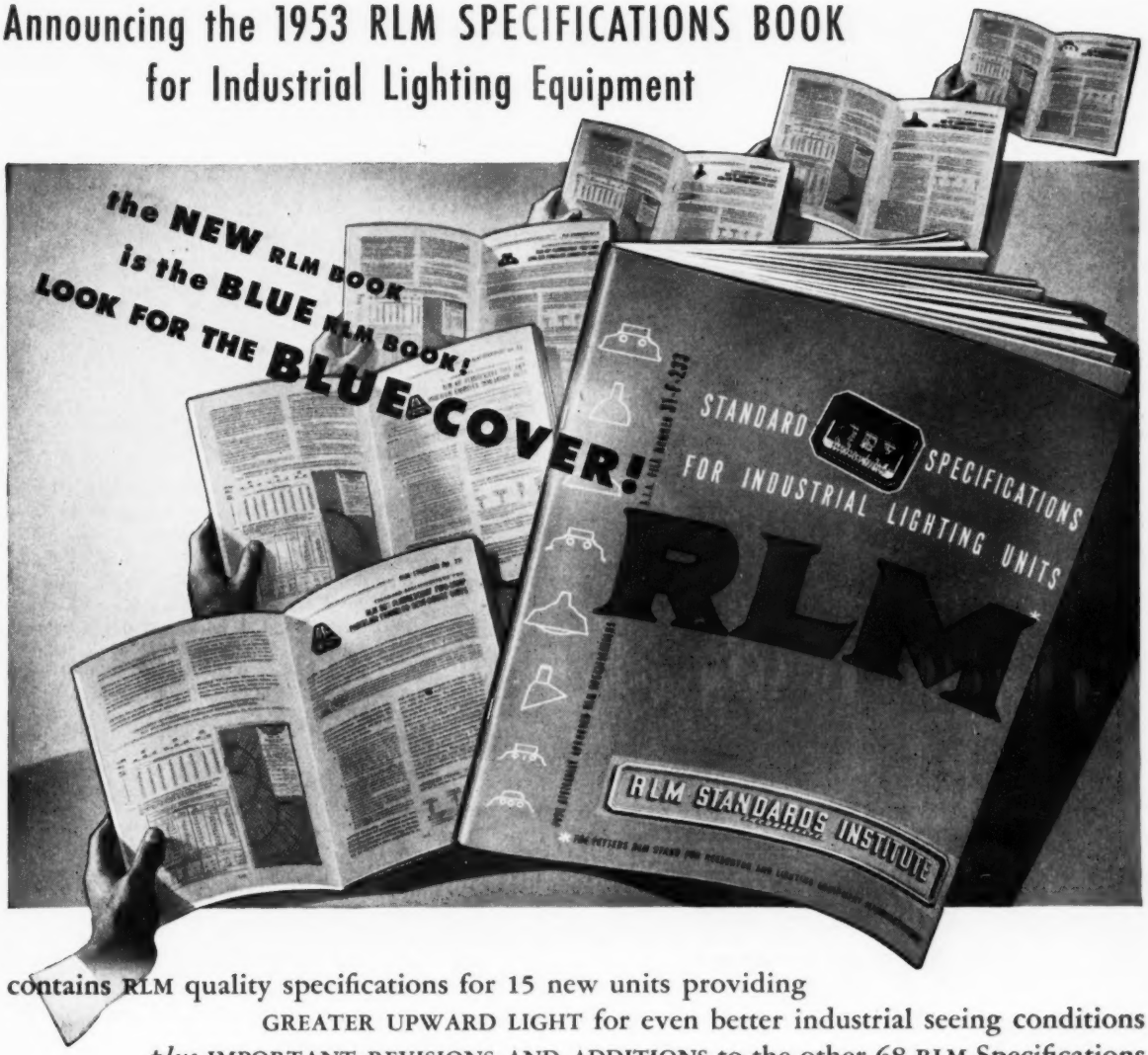
*Registered Trade-mark General Electric Company

You can put your confidence in—

GENERAL ELECTRIC

Announcing the 1953 RLM SPECIFICATIONS BOOK for Industrial Lighting Equipment


the NEW RLM BOOK
is the BLUE RLM BOOK!
LOOK FOR THE BLUE COVER!
STANDARD SPECIFICATIONS FOR INDUSTRIAL LIGHTING UNITS
RLM
RLM STANDARDS INSTITUTE

contains RLM quality specifications for 15 new units providing
GREATER UPWARD LIGHT for even better industrial seeing conditions
***plus* IMPORTANT REVISIONS AND ADDITIONS to the other 68 RLM Specifications**

Your copy of this newly-published reference book on industrial lighting equipment is ready now at no cost or obligation. Tens of thousands of architects, lighting engineers, electrical contractors, industrial executives and others have for 10 years relied on the RLM Specifications Book as an invaluable aid in measuring illumination, construction and performance standards, which are basic to lighting equipment efficiency, economy and ease of maintenance.

This new 1953 "blue-cover" edition is even more useful and valuable. It incorporates long-awaited specifications for 48", 72" and 96" RLM Semi-Direct Fluorescent Units. The new specifications cover 15 variations of this new "Upward Component" unit which directs from 20 to 30% of the light upward.

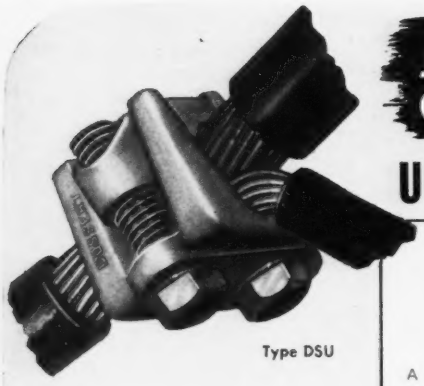
Altogether, this greatly-enlarged 1953 RLM Specifications Book has 52 pages, covering 83 different types and sizes of RLM-certified incandescent, fluorescent and mercury industrial lighting units. All specifications have been brought up-to-date in accordance with latest illuminating engineering developments.

Whether you buy, sell or specify industrial lighting equipment, you are invited to send for your FREE copy of the 1953 "blue-cover" edition of the RLM Specifications Book. Address request on your letterhead, please, to: RLM STANDARDS INSTITUTE, SUITE 815, 326 W. Madison Street, Chicago 6, Illinois.

MANUFACTURER'S NAME
COMPLIANCE WITH SPECIFICATIONS AND INSTRUCTIONS OF RLM STANDARDS INSTITUTE
ELECTRICAL TESTING LABORATORIES, INC.

RLM STANDARDS INSTITUTE
INCORPORATED
The letters RLM stand for Reflector and Lighting Equipment Manufacturers

R201



Type DSU

DOSSERT Connectors

UNEXCELLED!

FOR QUALITY...
DEPENDABILITY...
PERFORMANCE...

DOSULON

A one-piece bolt type variable service tap. Available in conductor sizes from 1/0 to 1000 MCM in copper or equivalent all-aluminum or ACSA cable sizes in type DSUN. Made of high strength copper alloy and equipped with bronze bolts. Rugged compact, facilitates neat taping.

For copper connectors— write for Cat. No. 53-7

For aluminum connectors write for Cat. No. A54-7

Immediate delivery on all standard items. Prompt delivery on specials.

VARIABLE HERCULON CONNECTORS

For power distribution jobs. Available in eight sizes to cover range of cable No. 8 solid to 1,000 MCM.

HL-2

H2L-2

H3L-2

HC

For use with aluminum, specify type DSUN

DOSSERT MFG. CORP.
249-255 HURON STREET, BROOKLYN 22, N. Y.
SINCE 1904

Representative—George S. Koch Associates, 420 Market St., San Francisco

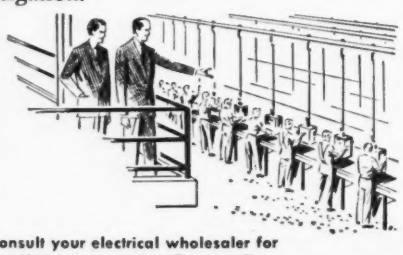
the Emblem of Quality since 1875

FARADAY

SIGNALS and SYSTEMS ADD *SPEED . . . SAFETY*

Properly designed and installed signals and systems are real time-savers that smooth out many a plant problem—help stop wasted motion. And solving individual signaling problems has been Faraday's business for *seventy-eight years.* These years of experience assure correct plans, correct installation. To be sure that your signaling system is operating at top efficiency, check with Faraday. No obligation.

NECK-TYPE BELLS



VIBRATING HORNS

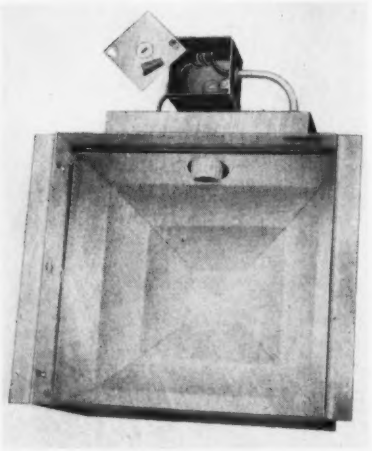
Consult your electrical wholesaler for details on the complete Faraday line.

HOLTZER-CABOT **FARADAY** STANLEY & PATTERSON

CONSOLIDATED BY:

SPERTI FARADAY INC. ADRIAN, MICH.

BELLS · BUZZERS · HORNS · CHIMES · VISUAL AND AUDIBLE PAGING DEVICES AND SYSTEMS

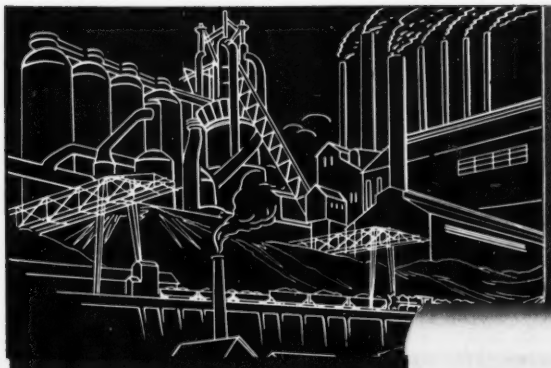


(24) **POLISHED** aluminum prismatic reflector is standard equipment on the 300-w, 1313 series recessed fixtures made by Prescolite Mfg. Corp., 2229 4th St., Berkeley, Calif. This unit, which comes with the patented Swing-Way hinge for quick relamping and cleaning, is designed for commercial installations where maximum brightness is desired, manufacturer states

(25) **PORTABLE** electric heater, the automatic Fan-Glo Heetaire, distributes infrared radiant heat and fan-forced heated air, turning itself on and off as necessary to maintain the selected temperature. Made by Markel Electric Products Inc. and La Salle Products Inc., Buffalo, N. Y., it has patented Neo-Glo elements; is 17½ in. high, 19 in. wide and 8 in. deep; weighs 15 lb

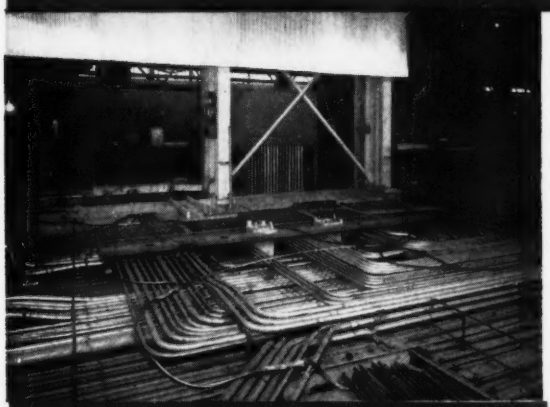
(26) **IMMERSION HEATER**—A flanged tubular-type electric immersion heater has been added to the Chromalox line. It gives higher heat output and a new size flange, 5⅜ in. in diameter. Heating elements come in two sheath materials: type TM-4 for water heating; type TMO-4 for oil or paraffin. Both types are single phase only and are available in 120-, 240-, 480- and 550-v with capacities ranging from 4 to 12 kw. Made by Edwin L. Wiegand Co., 7540 Thomas Blvd., Pittsburgh 8, Pa. Details in bulletin SD-169.

For More Data Fill in Coupon, Page 78



in a Pittsburgh steel mill....

112 Tons of SPANG Central Conduit



Today's modern steel plants use tremendous quantities of electric power to operate the many complex steel producing and processing machines needed to keep up with demand for steel products.

Installations of this type require conduit that . . .

—offers years of trouble-free service in a permanent installation.

—protects circuits in concrete-enclosed locations against pressure from concrete and corrosion from seepage.

—protects circuits in exposed interior locations against corrosion from atmospheric conditions, radical temperature changes and damage from contact with heavy equipment.

So, when Patterson-Emerson-Comstock, Inc., of Pittsburgh, specialists in steel mill construction, were called upon to build a new mill for a Pittsburgh steel manufacturer, they installed 112 tons of 1" to 4" Spang "Cenlaco" Conduit throughout the mill to handle the electrical circuits.

There were two reasons for specifying Spang:

1. SPANG CONDUIT IS QUALITY-CONTROLLED
Made from top-quality steel, Spang Central Conduit is carefully controlled under exacting conditions during forming and is thoroughly inspected to assure you of a reliable product with years of service life.

2. SPANG CONDUIT IS INSTALLED FASTER
Because of its quality-controlled manufacture, Spang Central Conduit offers such working advantages as easier bending, cutting and threading which saves time and money on installations.

You'll be sure of getting the finest conduit when you specify Spang. Take your choice of "Cenlaco," "Central White," "Central Black" or Spang EMT with the SPANGLEAM finish—all at your service.

SPANG CONDUIT

SPANG-CHALFANT
Division of The National Supply Company
GENERAL SALES OFFICE:
PITTSBURGH 30, PA.
District Offices and Sales Representatives in Principal Cities

Dry Type Distribution
TRANSFORMERS
All Sizes through 750 KVA

Illustrated is Floor Mounting Type CF, 10 through 300 KVA. Furnished with removable plates in sizes 100 through 300 KVA.

Illustrated is Wall Mounting Type CW, 7½ through 15 KVA. Also available in 5 KVA.

Illustrated is Wall Mounting Type EM, 50 VA through 3 KVA. Similar Type EMD (not shown) furnished in 5 KVA single phase, and 100 VA through 5 KVA 3 phase.

BURTON

Built to ASA and NEMA Standards

Burton Transformers are meeting the most severe tests with dependable, trouble-free service.

BURTON
EQUIPMENT CO., INC.
P.O. Box 631 4810 Firestone Blvd.
South Gate, Calif. LOgan 8-3151

BULLETINS ETC.

(27)—HIGH VOLTAGE CABLE—128-page book published by the Okonite Co., Passaic, N. J., gives complete technical information on rubber-insulated high-voltage power cables up to 35,000 v. Advantages, economies and versatility are discussed. Data include current-carrying capacity tables; aluminum conductor conversion factors; formulas for calculating effects of shielding, dimensional data on bare conductors and single-conductor cable constructions; installation recommendations; methods of determining conduit size, fill and area; methods for determining bend radii and pulling tensions. There are 29 pages of detailed drawings and instructions for splicing and terminating these cables. The book, OK-1075, is available from the manufacturer.

(28) DISTRIBUTION TRANSFORMERS — A four-page bulletin describing its new line of dry-type distribution transformers has been prepared by Wagner Electric Corp., 6400 Plymouth Ave., St. Louis 14, Mo. These transformers are Class B insulated 80 C rise and come in ratings 3 through 100 kva, single phase, 600 v and below. The new units are lighter and more compact than earlier designs and can be located wherever lower voltages are required for machines, portable tools or lighting, the manufacturer states. The bulletin, EU-106, No. 12, is available from the manufacturer's sales promotion department, Electrical Division.

(29) HOUSE ORGAN — Unistrut Products Co., 1013 W. Washington Blvd., Chicago 7, Ill., is offering its house organ, Unistrut Channel, to engineers, contractors, builders and others who request it. Articles deal with such subjects as materials handling, legal pitfalls, safety in the stockroom.

(30) SWITCHES—Information on all Federal Noark safety switches is contained in a new bulletin issued by Federal Electric Products Co., 50 Paris St., Newark, N. J. This bulletin describes type A, ACI switches through 1,200 amp; type A, double-throw through 600 amp; type D through 400 amp. Switches are available in raintight (NEMA III) and cast enclosures to meet NEMA specifications III, IV, V.

(31) PANELBOARDS — An illustrated bulletin covering its Vacu-Break panelboards has been published by BullDog Electric Products Co., Detroit 32, Mich. The 12-page bulletin is listed as VP-450; has dimensional data, horsepower ratings and other information. It explains the operation of the arc-snuffing Vacu-Break switch units and the 2½ in. sliding contact unit.

(32) HOSPITAL SERVICE—Explosion-proof Condulet electrical equipment for hospital operating rooms is described in bulletin 2589 offered by Crouse-Hinds Co., Wolf and 7th N. Sts., Syracuse 10, N. Y. It covers wiring devices, installation methods and types of Condulets for use in protecting electrical outlets, switches and other fixtures from explosive effects of anesthetic gases or liquids.

(33) CIRCUIT BREAKERS — Construction features, ratings, dimensions and weights of power oil circuit breakers, types OZ-15-100, OZ-15-250 and OZ-23-150 are given in a bulletin released by Allis-Chalmers Mfg. Co., 939 S. 70th St., Milwaukee, Wis. It is listed as 71B7946.

(34) CONTROL SYSTEMS—Bulletin GEC-931 on 720-cycle systems for off-peak control of water heating loads has been prepared by General Electric Co., Schenectady 5, N. Y.

KILL TWO BIRDS WITH ONE STONE—Fill out this one coupon and get back valuable information from as many sources as you indicate.

ELECTRICAL WEST *Not good after December 1*
68 Post St., San Francisco 4, Calif.

Please send me, without obligation, the new product information or catalogs:

If described in Product News, circle item number

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
21 22 23 24 25 26 27 28 29 30 31 32 33 34

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NAME ..... TITLE .....

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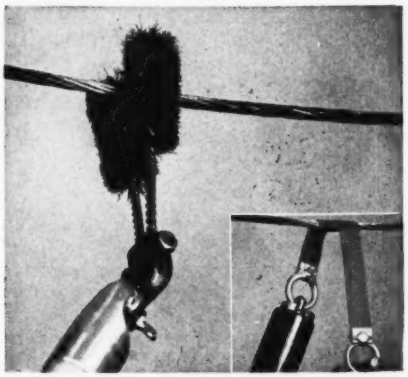
* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

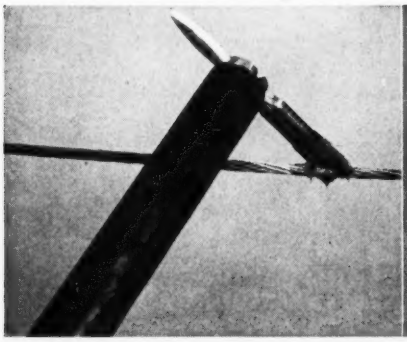
Two ways to add years of life to Tap Connections



Clean section of conductor where clamp will be applied. Use this wire brush (Cat. No. 4455-62). It fits on a Chance Universal Pole. Or, use a ring-fitted emery cloth (Cat. No. 4565). See inset.

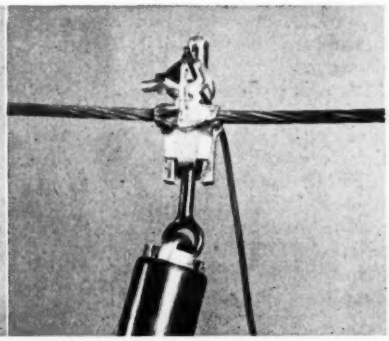
1 Treat contact surfaces to increase conductivity and reduce corrosion

For positive tap connections that will last longer—stay tight and troublefree even under unusually severe atmospheric or industrial conditions—have linemen make these simple preparations. You'll reduce maintenance and protect your conductors and tap clamps.



Then apply a good corrosion-resistant compound. You can use a brush, flat tool, or the emery cloth for this job.

Apply some compound to the contact surfaces of the tap clamp. This may be done on the ground.



Hang clamp on treated section of conductor. Tighten the clamp firmly and your long life connection is completed.

2 Install CHANCE AGP* Clamps to protect the connection

To get the most in long troublefree service use Chance Aluminum General Purpose Clamps. These aluminum clamps are heavily coated (.001) with high density cadmium. This surface is further fortified against electrolytic corrosion by a special process. The strong cast aluminum bodies are light in weight—easy on the conductor because they reduce conductor fatigue—easy to handle on a clamp stick. Contacts stay tight—the thermal expansion of the clamp is uniform with aluminum conductor . . . and since the thermal coefficient of copper is less than that of aluminum, the clamp will not deform copper conductor even under extreme temperature variations. The conductor is protected at all times.

Chance Aluminum General Purpose Clamps for aluminum or copper connections are multi-purpose clamps. They eliminate confusion in connector applications—reduce inventories—and simplify stocking problems. They are available in both the PC (Protected Connection) and Perma-Grip designs.

*CHANCE *Aluminum General Purpose — the Tap Clamp with* the RED *Eye Screw*

GENERAL ELECTRIC SUPPLY COMPANY

A DIVISION OF GENERAL ELECTRIC DISTRIBUTING CORPORATION

SAN FRANCISCO • OAKLAND • SACRAMENTO • STOCKTON • FRESNO • LOS ANGELES • SAN BERNARDINO • LONG BEACH
SAN DIEGO • BAKERSFIELD • PHOENIX • TUCSON • SEATTLE • PORTLAND • MEDFORD • TACOMA • SPOKANE

ELECTRA'S HUSBAND

"DID you ever in your life see a better television picture?" my host asked as he fiddled and fussed with the controls that gave the TV screen on his new set just the right degree of brightness for the room. The time was a recent Sunday afternoon. The place, the home of an advertising man in the suburb of one of our largest cities. The event we were about to watch was a New York Yankee-Cleveland Indian baseball game toward the tag end of the current season.

"It's a fine picture all right," I replied. "It has sharp contrast, lots of detail and there is no unsatisfactory eye sensation from the lines that make up the image. But where in hell did you get the set? I've never seen or heard of a Hannibal*."

"Nor did I until I saw the thing sitting here in the den a couple of weeks ago," the advertising man said. "It's a good story and there is just time enough to tell it to you before the game starts."

"Let's hear it," I assented indifferently.

As he arranged the curtains and put a couple more chairs in a circle around the set, he started his yarn in this fashion:

What with a new football season about to break and the World Series coming up the consensus around our house was that we either had to get our old 16-in. screen Mystic* set overhauled or buy a new one. So I said to the Missus that she should call the Mystic dealer from whom we bought our original set and get an estimate on an overhaul and a trade-in price if we bought a new set.

Well a couple of nights later I came home from the office and was told to look in the den. There sat this Hannibal job. The family said that it was on loan until our old set was repaired —if we wanted it repaired. Or if we wanted to buy this one, we could just apply the old one on the cost. The dealer would give us a fine trade-in allowance.

Later that evening when the whole family gathered to look at "Dragnet" we agreed that this Hannibal was the finest TV set anyone of us had ever watched. Before the evening was over I was commissioned to go down to the dealer's on Saturday morning and close the deal.

That's exactly what I did—almost. When I called on the dealer, our conversation went about like this:

"I'm Wilson Barnes. You put a new Hannibal TV set in our house on Revelstoke Road early this week while you looked over our old Mystic to see what was wrong. We like the new set. What will it cost us to trade?"

JUST WHO "SAVED ON ADVERTISING"?

"It's good to know that you enjoy the Hannibal," the dealer said. "I thought that you would. The Hannibal has few equals, if any, when it comes to satisfactory performance—perfect picture, high fidelity sound—it has everything. Now the retail price is $299.50, tax included. I'll allow you $50 on the old Mystic. That's considerably less than a new 21-in. Mystic would cost. We can quote you a low price like that because Hannibal spends no money on advertising but passes all of that saving along to the customer . . ."

"What did you say?" I almost shouted.

"Hannibal spends no money on advertising," he repeated.

"Brother that's the worst sales argument you ever pulled," I told him heatedly. "I happen to be in the advertising business. I make my living selling advertising. Fix up the Mystic and send it out! And take your blankety-blank Hannibal and pawn it off on some other sucker!"

On Tuesday he brought back the Mystic and took away the new set. Also he left a bill for $16.95 for repairs.

By the time the next Saturday rolled around I couldn't take any more argument from the family. Also, even I had to admit sheepishly that there was no comparison between the old and new sets. Having watched high class TV reception, we couldn't stand to look at the faded, blurred picture on the Mystic. Also at one time or another during the week all of us had sneaked a look at other makes of sets and none compared with the Hannibal in performance. So the following Saturday I went back down to the village and saw the dealer.

"You remember me," I commenced with an uneasy laugh, "I'm Wilson Barnes."

"Oh yes, Mr. Barnes," he said. "Does the old Mystic work satisfactorily?"

"Yes, but I want to talk about the Hannibal you installed for a few days," I said.

"I've been thinking about that," the dealer reflected cannily. "Tell you what I'll do. Suppose I send out the Hannibal, give you an allowance of $75 on the old Mystic and cancel the repair bill."

"It's a bargain," I said before he could utter another word.

Just then the announcer reported that Vic Raschi and Lemon would do the pitching so I interrupted my host with this comment:

"You got a bargain—better than you deserved, I think."

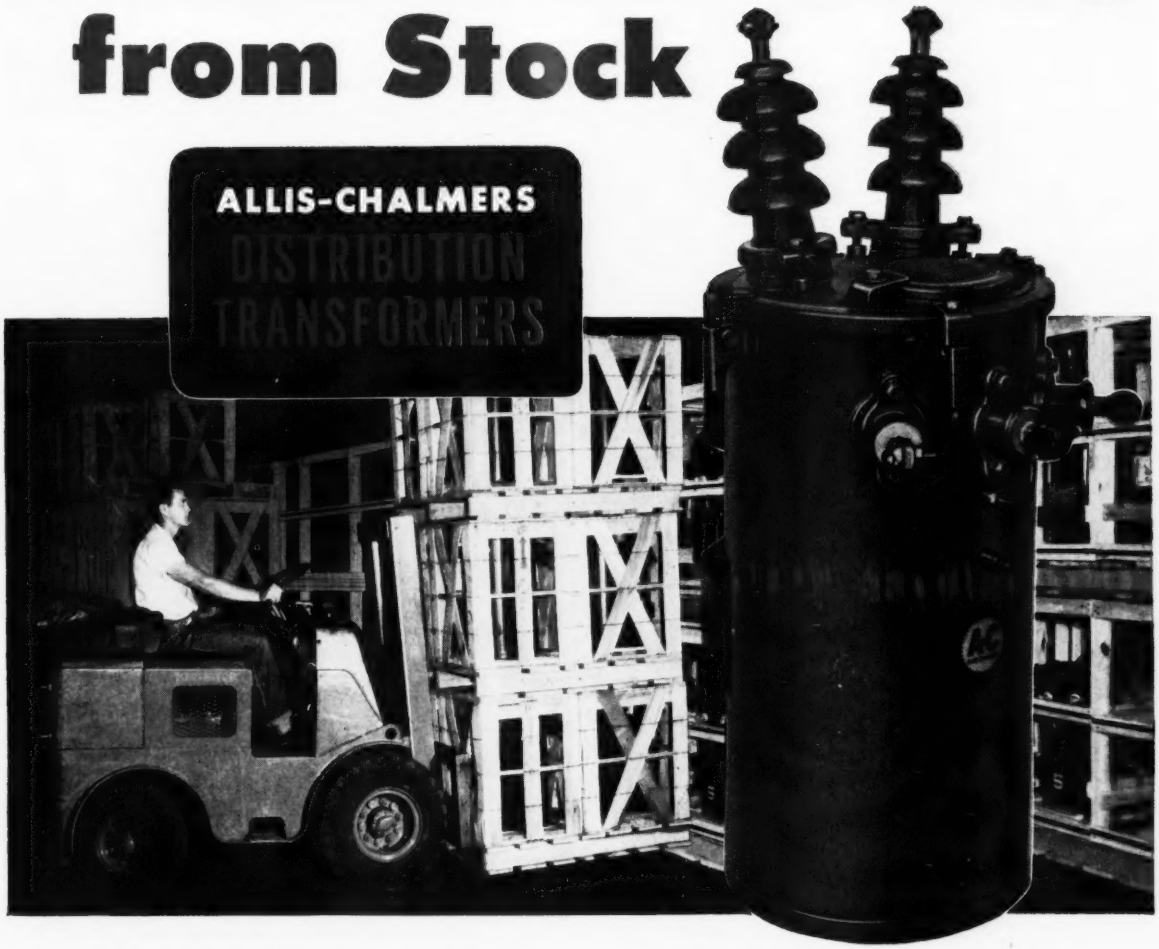
"That's right, but think what that dealer lost because at no time had I ever seen a single word of advertising about Hannibal sets. If I could have recollected seeing the name Hannibal in an ad in *Electrical Merchandising*, or in the *SEP*, or on a carcard or a billboard, or even in the village weekly newspaper, just think what that dealer would have saved. One round trip to deliver and install. The cost of repairing the old set. And $25 on the trade-in. I didn't save the cost of advertising. The dumb so-and-so lost it and more.

"Anyone who thinks that the elimination of advertising will save the ultimate consumer money is just plain crazy. Advertising—printed salesmanship—has contributed as much to our high standard of living as has mass production. People have every right in the world to be suspicious of unadvertised merchandise. Everybody knows that."

"Amen," I concluded just as the announcer called out, "Play ball!"

* The name is fictitious for obvious reasons.

Immediate Delivery from Stock



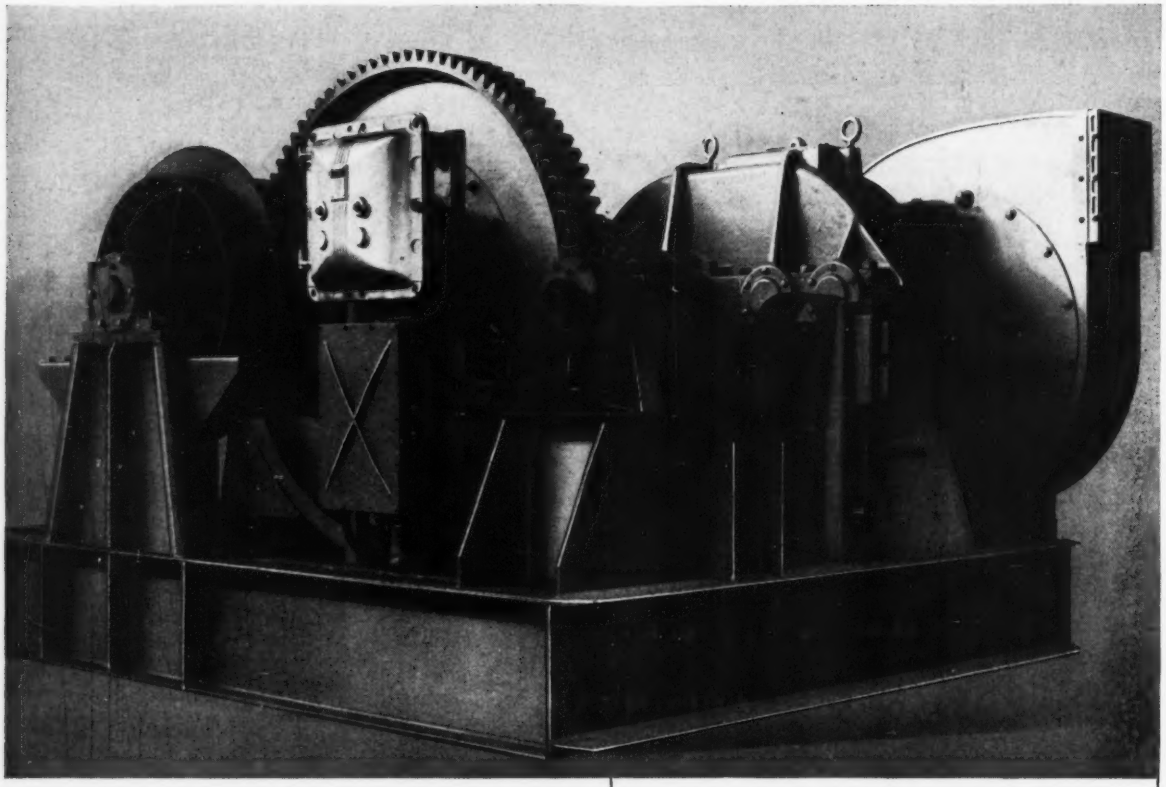
GOOD NEWS! You can now get your distribution transformers out of local stock to take care of emergency situations. Allis-Chalmers offers you self-protecting and overload indicating types as well as conventional designs. All are available in most popular ratings from strategically located stock points throughout the country.

Centralized control of all stock distribution transformers gives Allis-Chalmers fast, flexible handling throughout the nation. Transformers are constantly shifted to meet area requirements, thus assuring clean, fresh stock.

Regardless of your immediate requirements, it will pay you to investigate your local A-C transformer supply for fast, convenient service. Take stock of your needs today and order now from your nearby A-C district office. Or, for information, write Allis-Chalmers, Milwaukee 1, Wisconsin. A-4158

ALLIS-CHALMERS

A-C ALLIS-CHALMERS



DESIGNED and built by Paceco, this wire rope type hoist uses a fan as a brake for control of lowering. The fan dissipates the energy produced during the lowering cycle. Motor drives through a triple reducer into a large ring gear on the hoisting drum. While common practice calls for 2 drums driven from a single shaft, Paceco has used a single drum with an ungrooved center section. By installing a drum gear in the center, over-all width of unit is reduced, and gears and bearings normally required for two drums have been eliminated. Drum carries its ropes in perfect syncronization—always.

Paceco cordially invites your inquiries on cranes and hoists of all types and sizes.

Built by PACECO

INTAKE GATE HOIST for Arghandab Dam, Afghanistan

(drum and gear guards removed)

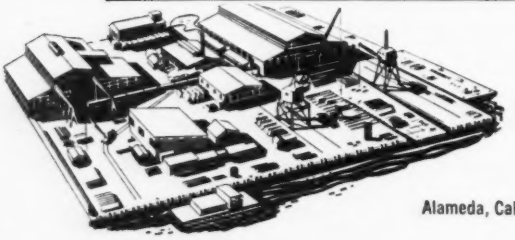
Rated load—71 tons | Maximum lift—162′

Speed of hoisting—2′ per minute

Speed of lowering—6′ per minute

Built for Morrison-Knudsen Afghanistan, Inc.

PACECO®
"TAILORS OF STEEL"



PACIFIC COAST ENGINEERING COMPANY

Engineers • Machinists • Fabricators

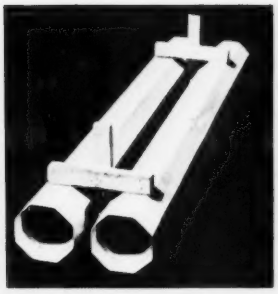
Alameda, California · LAkehurst 2-6100 • 417 So. Hill Street · Los Angeles 13 · MAdison 6-9345

Check these

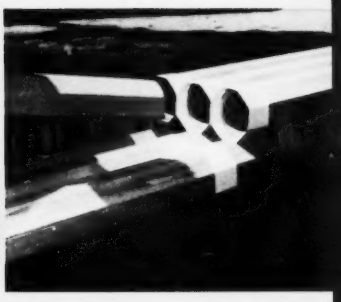
field advantages of

New SOAPSTONE OCT-O-DUCT

Standard bends (90°, 45°, and 11¼°) can be cut with a hand saw to fabricate any degree bend in the field. Cast-iron adapters and standard pipe fittings combine to easily join OCT-O-DUCT to other sizes and types of conduit. Flared, protective bell-ends are also available.



No need to pay for special, heavy and expensive spacers when you use OCT-O-DUCT. Treated-wood type spacers shown here make spacing cheap and easy. Available in any desired combination of vertical and horizontal separation. Or use common bricks or flat concrete strips.



Where no conduit spacing is needed, as is usually the case in communication circuits, OCT-O-DUCT stacks easily, up to 24 high if desired. Sturdy wax-impregnated paper collar lays flat and snug, does not interfere with alignment of ways.

Workmen in the field carry plenty of the wax-impregnated collar-type couplings right in their pockets. Collars come folded flat, slide easily but snugly over beveled end of OCT-O-DUCT to hold conduit in line, keep out soupy aggregates during concrete pouring.

The object of burying a power or communication circuit underground is to protect the circuit against physical damage and to assure permanent functioning. The conduit used usually represents no more than 10% of the cost of the underground duct system. But the conduit used affects much of the other 90%.

Speed of laying, availability in the quantities and sizes you need, delivery to the job, a smooth bore to reduce cable wear and speed pulling, the right electrical, chemical and mechanical characteristics are all important conduit factors that affect the total cost.

Soapstone conduit has proved to be outstanding in all these respects and many more. For over 25 years it has been proving this to electric utilities, telephone companies, electric and underground contractors, Army, Navy, Air Force and industrial plants in the Western U. S. and overseas.

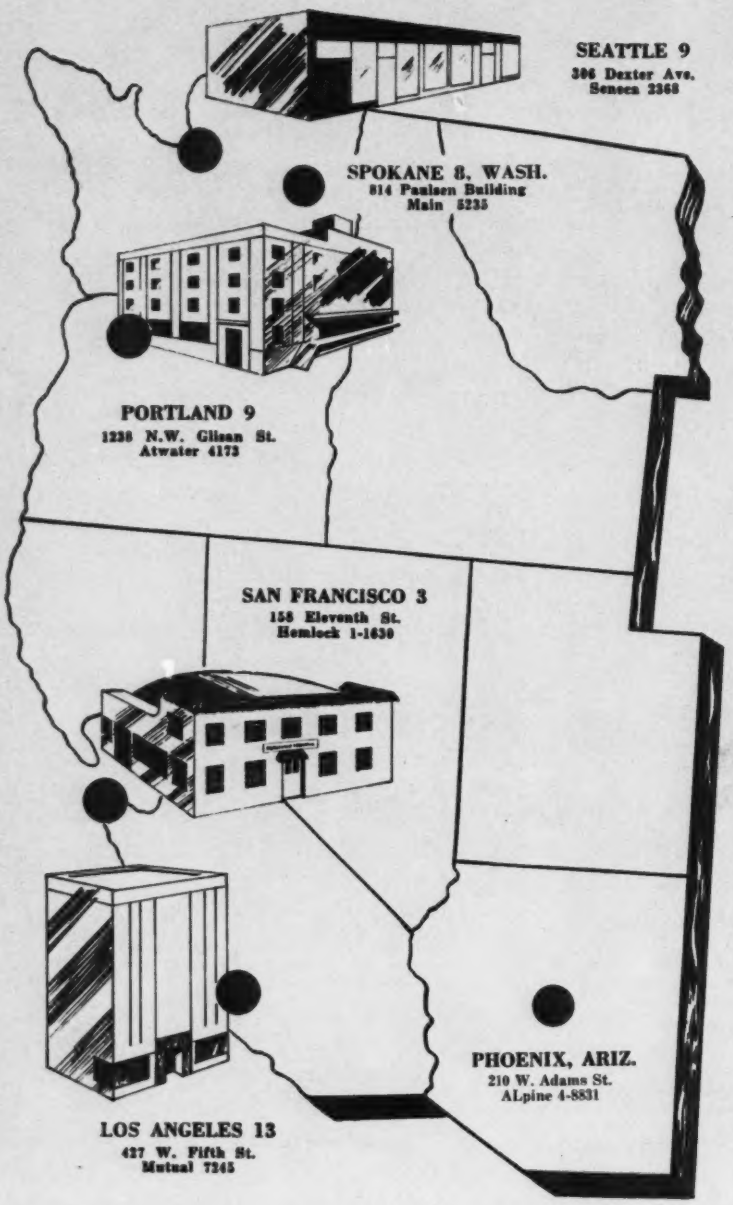
SOAPSTONE DUCT COMPANY

110 Linfield Drive, Menlo Park, Calif. • Factory: Oakland, Calif.

Distributed in the West by Maydwell & Hartzell, Inc.

San Francisco · Los Angeles · Phoenix · Portland · Seattle · Spokane

SOAPSTONE SUPERIOR CONDUIT • PERMANENT CIRCUIT PROTECTION



Where-to-Buy in the West

KEARNEY
Utility Equipment

VICTOR
Porcelain Insulators

KORTICK
Pole Line Hardware

GARDNER
Transformers

FEDERAL
Communication Equipment

ST. LOUIS
Angle Pins and Specialties

SOAPSTONE
Underground Duct

HEMINGRAY
Glass Insulators

Locust Pins
Oak Brackets
Cedar and Fir Poles
Douglas Fir Crossarms
Redwood, Oak and Fir Moulding
Galvanized Guy Strand
Galvanized Telephone Wire

ELECTRICAL Transmission Distribution Communication EQUIPMENT

Engineers and Factory Distributors

MAYDWELL & HARTZELL
INCORPORATED

Responsibility...

and a river to cross

Most transmission line spans are routine for Louisiana Power and Light Company. But the broad Mississippi called for a 3850-ft main span, two 1000-ft anchor spans and high water clearance of 150 ft over a busy ship channel.

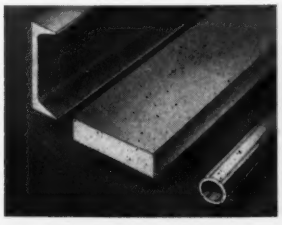
Alcoa, called in for consultation, designed and manufactured special ACSR to meet the exacting requirements of conductance and tensile strength. Furthermore, conductors were ordered in the accurate lengths required to give specified sags in each span. Cable length determinations for this double circuit crossing involved calculations by experts. Dead-end fittings were applied to each length at the mill before shipment to the job. When pulled up into position, these conductors fitted perfectly.

Unusual service? Not for Alcoa. We co-operate readily because we believe that the best installations are just as important as the best products. This is your guarantee of satisfaction with Alcoa Aluminum Electrical Conductors. Aluminum Company of America, 2103-K Alcoa Building, Pittsburgh 19, Pa.

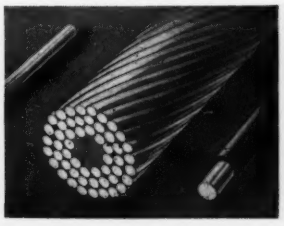
Alcoa Aluminum

ALUMINUM COMPANY OF AMERICA

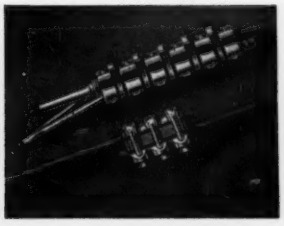
Alcoa Aluminum Bus is available in rectangular and solid round bars, channels and tubular shapes.



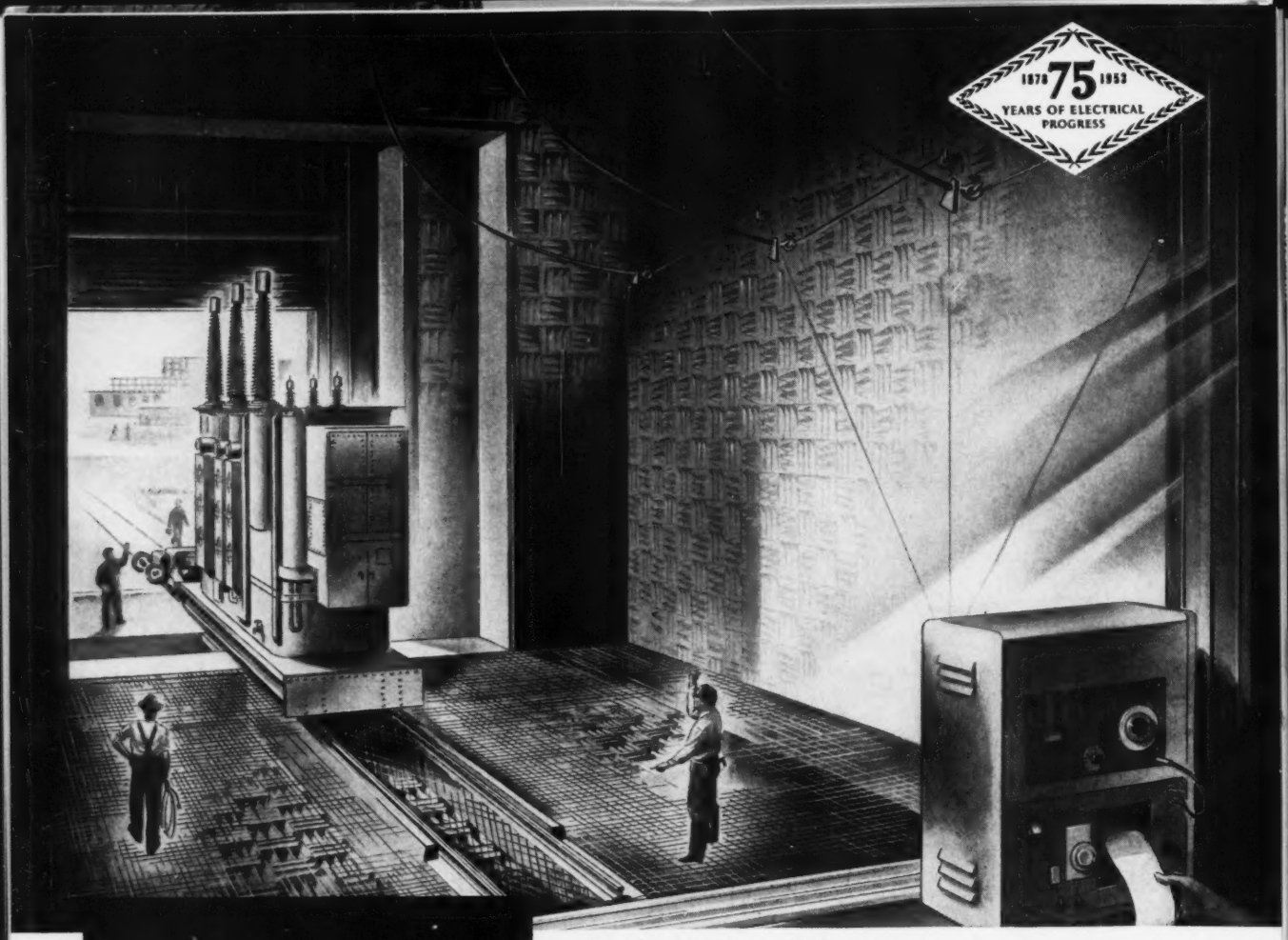
Alcoa Aluminum Electrical Conductors include ACSR, solid and stranded aluminum wire, bare or covered.



Alcoa's full line of aluminum accessories, is correctly designed for use with all aluminum conductors.



1878 75 1953
YEARS OF ELECTRICAL PROGRESS



New $1,500,000 sound laboratory, looking from the control room into the anechoic chamber through three thicknesses of glass, you can see the strange pattern formed by the Fiberglas wedges which eliminate echoes. Coming through pressure doors is a 300,000-kva power transformer on a specially built 40' transfer car.

Preformed power transformer core, a low-strain, efficient magnetic circuit designed to take full advantage of the highly directional properties of cold-rolled, silicon steel in small power transformers. Here J. R. Meador (right), Mgr. Development Engineering, discusses the new core with Lynn Wetherill, Mgr. Engineering, Power Transformer Dept., emphasizing that losses, exciting current and noise level as well as weight and dimensions can be varied to best suit conditions of the particular application.

What is G-E doing to help lick TRANSFORMER NOISE PROBLEMS

Transformer noise, an important problem where today's domestic electrical consumption has forced locating large substations in the midst of residential areas, will be the target of General Electric's new one and one half million dollar transformer sound testing laboratory now under construction at Pittsfield, Mass. In one of the world's largest labs devoted exclusively to sound research, G-E scientists will work with controlled conditions and use equipment which can measure sound to as close as one-half decibel. Their aim is to further analyze the basic causes of transformer noise and then find better ways to make low noise compatible with lower ultimate cost.

Well aware of the noise problems faced by the utility industry, G-E has already developed the pre-formed core construction for small power transformers which permits varying the noise and performance characteristics over a wide range. The ultimate objective of the sound lab is to permit the design of transformers which will take full advantage of cost reducing trends to light weight, modern construction while at the same time developing the desirable sonic characteristics which will make G-E transformers good neighbors of the homes they serve. General Electric Company, Schenectady 5, N. Y. 301-244

MORE POWER TO AMERICA

GENERAL ELECTRIC

OCTOBER 1953 Vol. 111, No. 4

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

Westinghouse Photo

This traveling exhibit is an example of what one large electrical manufacturer is doing to tell the automation story for . . .

Tomorrow's Industrial Revolution

In the last decade industrial expansion in the Far West has more than kept pace with American industrial growth. Expanding markets, unexploited resources, unexcelled working conditions, the trend toward decentralization, and a myriad of other advantages have attracted industry westward. Result has been a revolution that excelled the '49 Gold Rush in its effect on the Western economy. One of the industrial segments to profit most from this revolution has been the electrical industry.

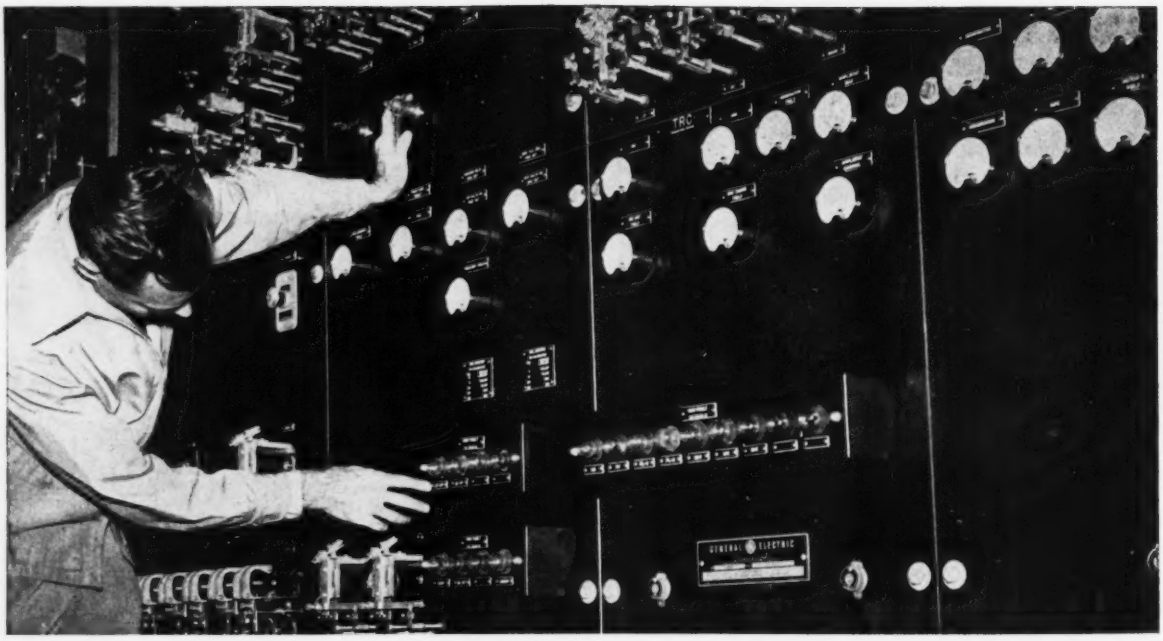
But what of the future? Has the industrial revolution run its course? Many of the critics of American business would have the public believe that the 20th Century American industrial revolution has expired and that the greatest industrial machine in the world can go no faster and no further. Fact is that this industrial revolution is on the threshold of new and greater developments than those that have aroused world-wide admiration on the one hand and misgivings on the other.

Economic necessity coupled with technological advances will be the basis for this continued revolution. The economics stem from simple facts. To maintain our present standard of living in this country the productive capacity per worker must increase 43% by 1960. This compares with an actual increase in output per factory worker of only 21% between 1940 and 1950. *Factory* magazine reports that population growth and a slower expansion of our working force will demand that the industrial tempo be stepped up to these higher levels.

The technology to spur the revolution forward will come from automation. Automation has been variously defined as industrial gadgetry, supermechanization, applied electronic control, or the total elimination of manpower. It is some of all of these. Mechanization — the force that has powered the industrial revolution of the last 50 years—implies the replacement of manpower with mechanical power, humanly controlled. Automation removes the human element, leaving a machine that literally controls itself. From this will come the automatic factory, with production lines and operations functioning with a continuity not heretofore possible and with electronic interlocks to insure the utmost reliability together with perfect performance.

If industry is to supply more and more goods to more and more people at lower and lower costs, it must turn to automation. However, aside from reducing costs by increasing production rates, there are other advantages. They include better quality control due to uniformity of product; improved reliability of product; minimum waste of materials; reduction in manpower requirements; and continuity of production.

Extension of this industrial revolution spells greater and greater opportunities for the electrical industry. It was electric power and electrically driven machines that contributed most to the building of America's great industrial machine in the 1900-1950 era. The automatic factory of the future will draw upon our industry to an even greater degree than in the past. New machines involving more electrical applications and larger energy demands will make up the automatized production lines of the future. They will involve intricate electronic controls and communication systems. Within the next ten years these developments will double today's industrial loads and present industrial energy consumption.



For industry here is a new electronic faultfinder with a memory feature that makes it possible to locate faulted circuits quickly

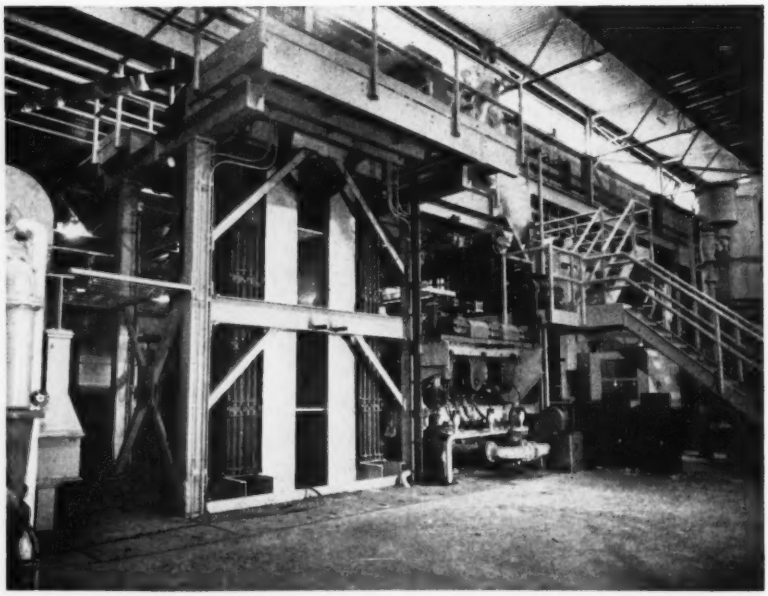
Tin Mill Has Electronic Faultfinder

Resistance heating, X-ray and beta-ray gaging, pinhole detection and electrostatic oiling are other notable applications

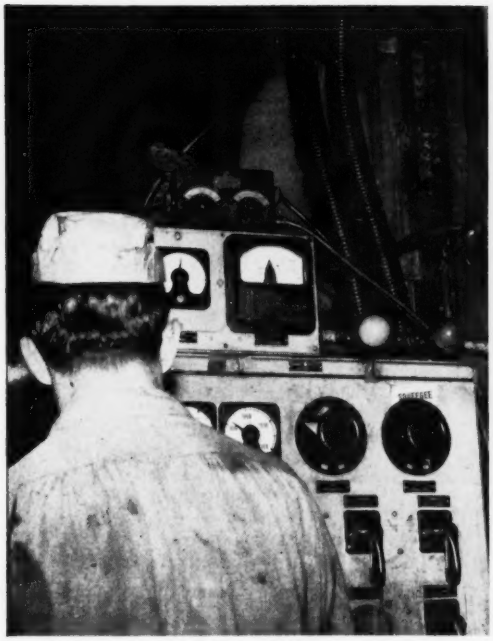
The West's newest and most modern tin plate mill at the Fontana, Calif., plant of the Kaiser Steel Corp. offers many interesting electrical features. This mill, designed and constructed by Kaiser Engineers Division of Henry J. Kaiser Co., has an annual production capacity of 200,000 tons of tin plate. Included in this figure are hot-dip and electrolytic tin plate. George B. Scheer was chief consulting electrical engineer.

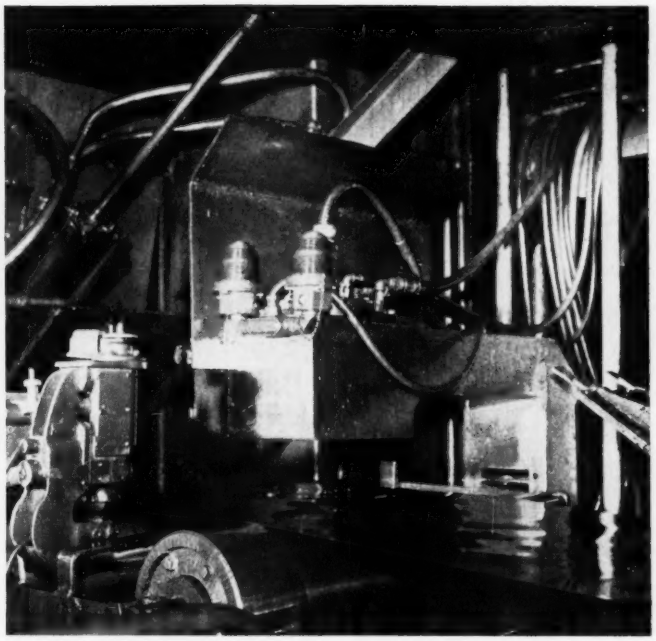
The magnitude of the electrical portion of a mill of this type is evidenced by the fact that the total connected motor horsepower is 36,632. Installed power transformer capacity involved is in excess of 21,000 kva. Lighting alone requires 1,200 kva of transformer capacity. Over 1,000,000 lineal feet of wire and cable were used, as well as 178,000 lb of copper bus bar.

Rather than attempt a general discussion of all this electrical equipment with its intricate controls, a few special electrical applications that might



Large iron-core reactors that isolate a-c from d-c on tin flow section of plating line





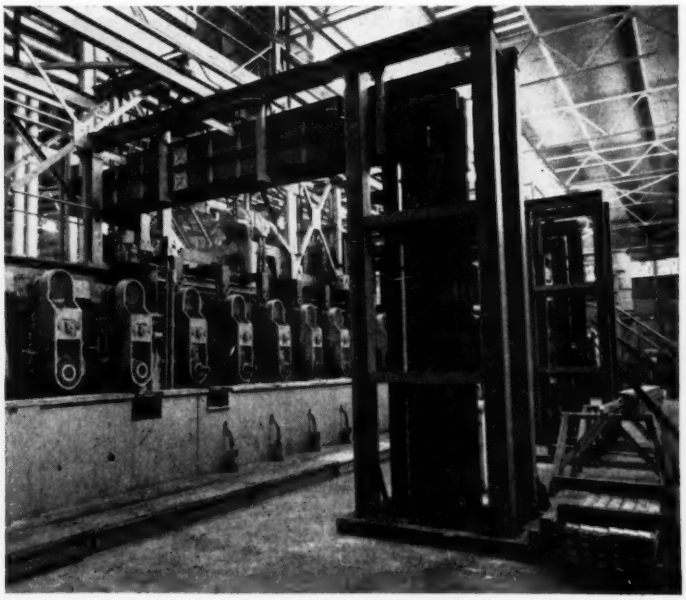
Operator observes meters to detect any deviation in thickness of steel strip leaving five-stand mill as measured by X-ray gage

find use in other industries will be described. The newest of these is an electronic faultfinder with a memory feature.

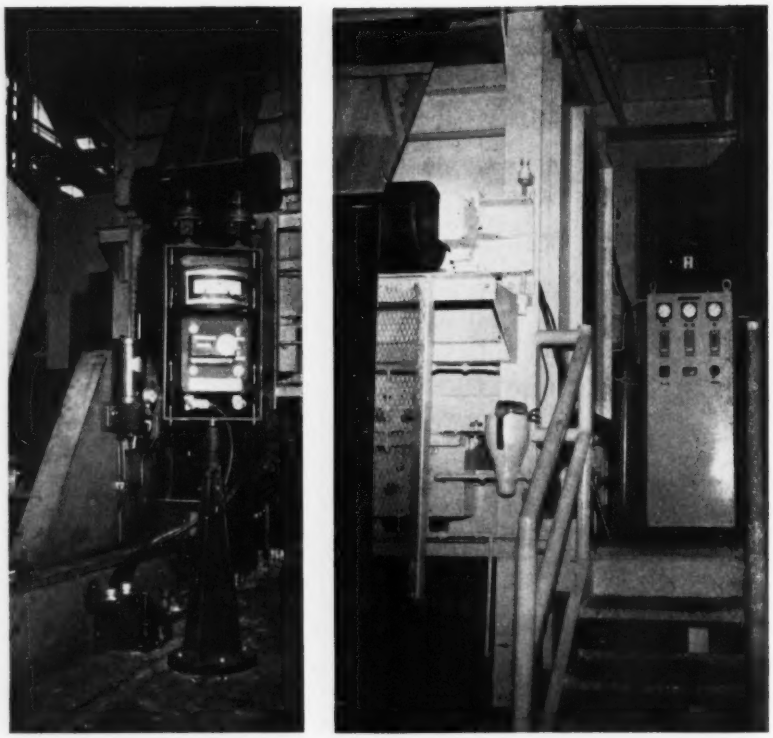
Faultfinder Equipment

Electrical equipment for the five-stand cold reduction mill used to reduce the thickness of the steel to tin plate gages is so complex that a recently developed type of faultfinder has been used to aid the maintenance man in the event of electrical troubles. Differing from the more common faultfinders in use today, this General Electric device has a memory that helps solve one of the maintenance man's biggest headaches — the fault that occurs repeatedly but seems to cure itself each time, leaving no trace.

On this faultfinder, the fault-location indicators are cold cathode gas-filled tubes. Under normal conditions the tube fires continuously. In the event of an open circuit the firing of the tube stops, giving an indication of the location of the open circuit. The tube is extinguished until reset manually by the maintenance man. The



Interlaced bus leaving transformer at left center handles heavy current used to reflow tin by resistance heating on plating line



Beta-ray gage, left, measures thickness of tin deposit. Right, electrostatic tin oiler

cold reduction mill faultfinder is shown in its location on the variable voltage panel in one of the accompanying photographs.

Electrolytic Tinning

Electrolytic tinning is of special interest to the electrical field because of the high magnitude of currents involved. The cleaning section bus bar has a capactiy of 15,000 amp. Pickling of the cleaned strip uses up to 31,000 amp. For plating, a total of 12 generators is used to supply 90,000 amp. Chemical treating of the tinned strip requires 4,500 amp and the flow brightening of the tin plate requires up to 15,000 amp.

The flow brightening or reflow of the tin is accomplished by resistance heating of the strip. To do this, alternating current at 210 v is applied to the strip by means of rolls that are in contact with the strip. Two 1,500-kva transformers are used to supply the reflow current. The current is controlled by means of a 3,000-kva saturable reactor in the primary of the reflow transformers.

The accompanying photographs show a portion of the plating negative bus and the reflow tower as well as a view of the low-impedance reflow bus. As shown on the photograph of the reflow tower, current in the strip in the reflow section of the line is blocked from the plating section by a series of iron-core reactors that isolate the a-c from the d-c plating section. Because of the extremely high a-c current used for reflow of the tin, it is necessary to interlace the bus to reduce the reactance. One section of this interlaced bus is shown above the reflow transformer.

Gaging and Inspection

Of extreme importance in the production of tin plate is precise gage and coating of the product. The sheets of tin plate must be extremely accurate in over-all dimensions, must be coated with the proper thickness of tin and must not contain any defects such as pinholes. Among the devices used at the Kaiser tin mill to assist in production and inspection are the flying micrometer, the X-ray gage, the beta-ray gage and the pinhole detector.

The flying micrometer and the X-ray gage are shown here. They are used to measure continuously the thickness of the steel strip. The measurement is shown in two ways: (1) readings are continuously recorded and (2) for the convenience of the mill operators, deviation indicators are used as shown. These indicators show plus and minus deviations from preset values so that the operator is aware at all times of the variation in thickness of the steel being rolled.

The flying micrometer is a contact device in which the moving strip passes between a pair of small steel rolls. One roll is fixed in position, the other roll is spring loaded and moves up and down with the variation in strip thickness. This movement varies the reluctance of a circuit and is translated into thickness in inches.

The X-ray gage used for measuring the strip thickness is a noncontacting gage that uses a 50,000-v X-ray power supply and a detector that measures the transmission of X-rays through the steel. This is calibrated again in thousandths-of-an-inch thickness and shown on deviation indicators.

The beta-ray gage is used on the electrolytic tinning line to measure the coating of tin that has been deposited electrolytically on the steel strip. This is, again, a noncontacting device that does not touch the strip. In this instance, material emitting beta rays is used. The transmission of the beta rays is measured and this quantity is a measure of the thickness of the coated material.

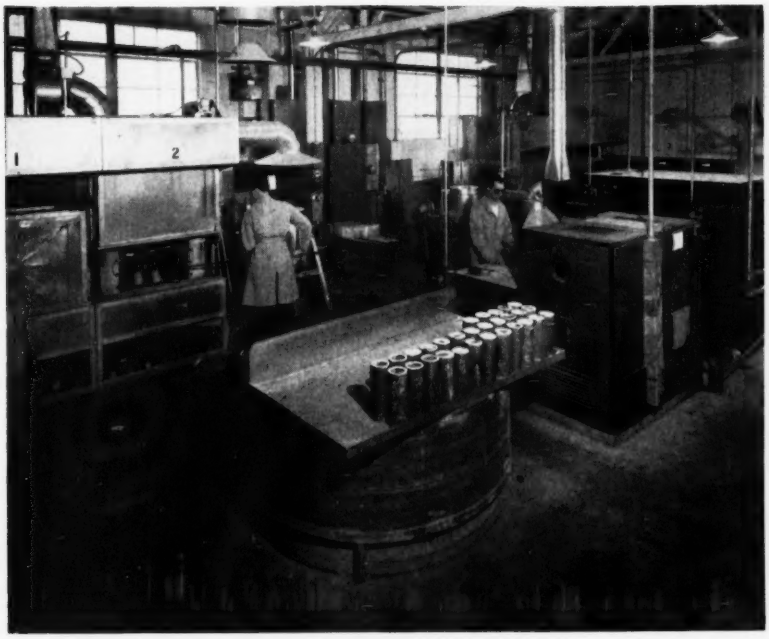
The pinhole detectors used are photoelectric instruments and powerful light sources. Any passage of light through the strip is detected and marked on the strip. The pinhole detector and the beta-day gage both automatically reject material that is not satisfactory, thus permitting only the prime product to be stacked for shipment.

Electrostatic Oiling

Most tin plate must be shipped to the can companies covered with a film of oil for satisfactory storage and rehandling. On the Kaiser electrolytic line this is accomplished by atomizing the oil by air pressure and electrostatically depositing a film of oil on the moving strip. The electrostatic unit illustrated uses a 67,000-v power supply to produce the electrostatic field necessary. The electrostatic method assures a complete coverage of the strip.

Material Handling

A 200,000-ton annual production requires almost continuous handling of material in coil or box form. Battery-operated lift trucks are used to a large extent to accomplish this movement of tin plate. Individual chargers are used. The chargers are provided with portable cords that permit their use on any battery in a designated section of the battery table. The battery-charging station is arranged so that a truck can drive up to the battery table where a discharged battery is removed and a charged battery installed with a minimum of effort.



Casting room, left, has six electric ovens and two induction melting furnaces. At right, the treed patterns are enclosed in a flask

And Now the White Collar Foundry

Don Kearton Industrial Sales Engineer, Portland General Electric Co.

A few years ago the word foundry would have created a mental picture of a grimy, smoke-filled room with the workers dressed in dirty clothes, perspiring freely as they ran from the smelting pots to molds with ladles of white-hot metal. Today a visit to the Precision Castparts Corp. foundry, located in southeast Portland, would dispel all of these preformed ideas, for here is a plant that has proved the proper use of electricity can help make a foundry a pleasant place to work and a profitable venture.

The entire work area is designed for employee comfort. Air is cleaned by filtering. The work is laid out in assembly-line fashion to minimize employee fatigue and to expedite production.

Precision Castparts Corp. specializes in investment casting, a process that permits the multiple casting of small parts in one mold. The process calls for accurate control from the making of the wax pattern to the shipment of the completed part.

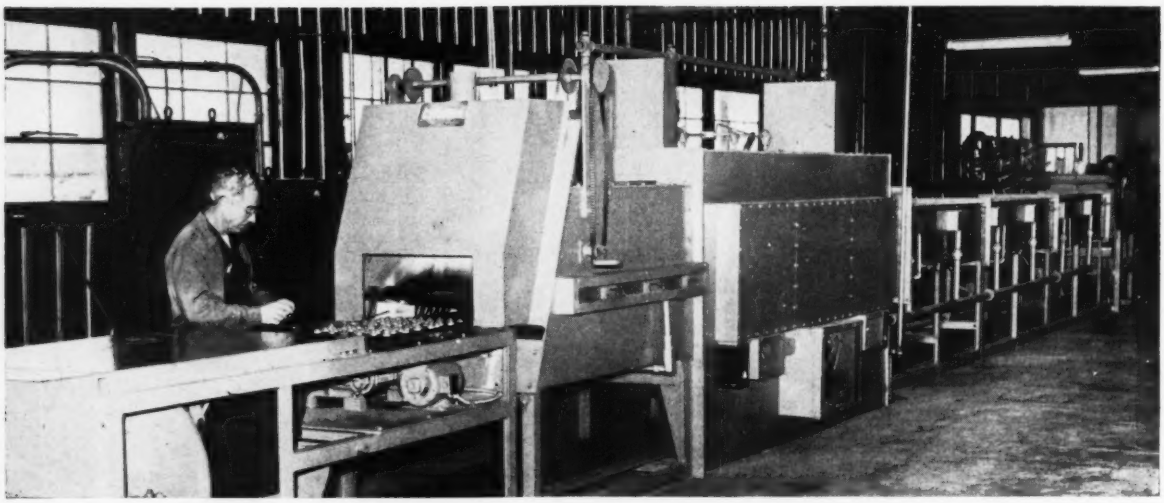
The wax patterns are prepared by women who handle their compressed air activated molding machines with a skill that produces a surprisingly low number of rejects. These patterns are assembled on a wax "tree trunk" and the entire "tree" is centered in a metal mold form. The investment, which is mixed electrically, is poured around the tree and allowed to harden.

The metal mold form is then placed with others in one of two three-decked, low-temperature electric ovens where the wax patterns are melted out of the mold. At the proper time, the molds are removed and placed in one of four high-temperature electric ovens for mold curing. Accurate temperature control was one of the key factors that influenced Precision's management to use electric furnaces for the baking of the investment molds.

Multiple patterns are clustered like a tree

The metals used for the manufactured parts are both of ferrous and nonferrous types. With a wide range of metal melting to control accurately, it was determined that induction heating would do the best work. That the result of Precision's management planning has been successful is apparent from the fact that the concern has on order two larger induction furnaces to permit pouring larger castings. A recently added feature is a shell molding machine to prepare the molds for the expanded metal capacity in this West Coast plant.

Yes, the day of the white-collar foundryman has arrived. Electricity has made the foundry almost as nice a place to work as an office and, for a great many men and women, much more interesting.

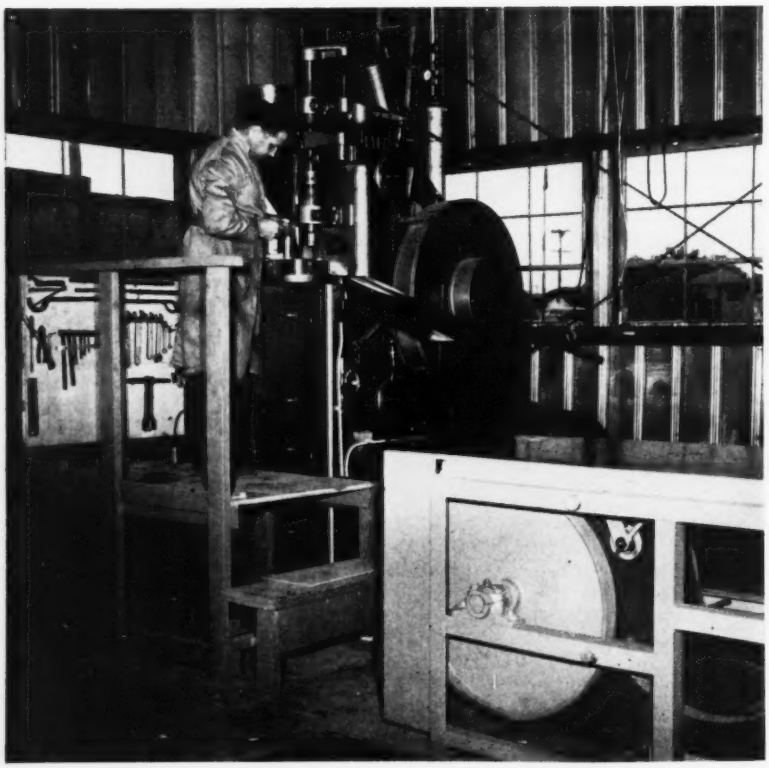


Sintering furnace used in powder metallurgy produces parts superior to those formed by casting methods and at competitive prices

Powder Metallurgy Displaces Die Casting

Newest metal forming process is used in making plumbing parts of superior quality

Lewis B. Reed
Industrial Heating Consultant
Los Angeles

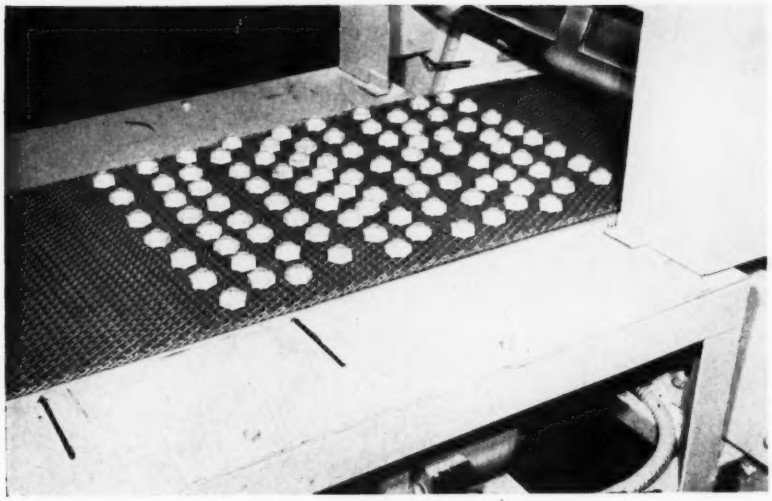


Press makes powder compacts under pressure of 50 tons at rate of 1,500 parts per hour

Powder metallurgy is one of the newest metal forming processes, yet it is closely related to the oldest. History tells us it was not possible to get enough heat to melt copper or iron when man first worked on metallic ores. Yet metals were formed by beating the heated particles of ore into masses of metal. Today metal powders are pressed into desired shapes, sintered, with the sintering temperature below melting point of the metals. Result is a homogeneous mass with all properties of a die or sand casting.

Process Explained

Technically speaking, the process involves the forming of a compact by compression, followed by heating or sintering. The compression is such that the atoms diffuse from particle to particle, with the atomic forces creating a continuous solid phase. Sintering increases the mobility of the atoms and accelerates their diffusion between particles. It also causes the recrystallization and grain growth that occurs when a piece of cast metal is annealed. This eliminates strains produced by cold pressing. No fusion usually takes place or, if it does, the fusion is of a minor constituent only. The advantage of the process is the possibility of attaining metallurgical compositions



Compacts pass into the electric sintering furnace. Part is the bonnet cap for a valve

and properties not possible by casting. This is possible because the process may be applied to individual, alloyed or mixed powders, with or without the inclusion of nonmetallic constituents.

The refractory metals, like tantalum, molybdenum and tungsten, have extremely high melting points and fusion produces undesirable coarse-grain structure. By pressing the powders of these metals into bars, then sintering by passing current through them while in hydrogen or a vacuum (depending on the metal), the bars can be swaged or rolled into wire.

Superhard materials, like the cemented carbides and diamond-impregnated tools, are extremely difficult to shape. As powders they can be pressed into the desired shape and sintered. Or they can be formed into bars, given a low presinter heat, cut, machined or ground into the final shape, then given a high heat sinter. By controlling the porosity of compacts, bearings and other metallic parts can be formed, then given a treatment that fills the pores with oil. The result is a self-lubricating bearing.

West Coast Application

E. A. Vermere Co. of Los Angeles is the second company west of Chicago to undertake operations involving this process. The company has been die casting its plumbing parts for many years but has now changed to powder metallurgy.

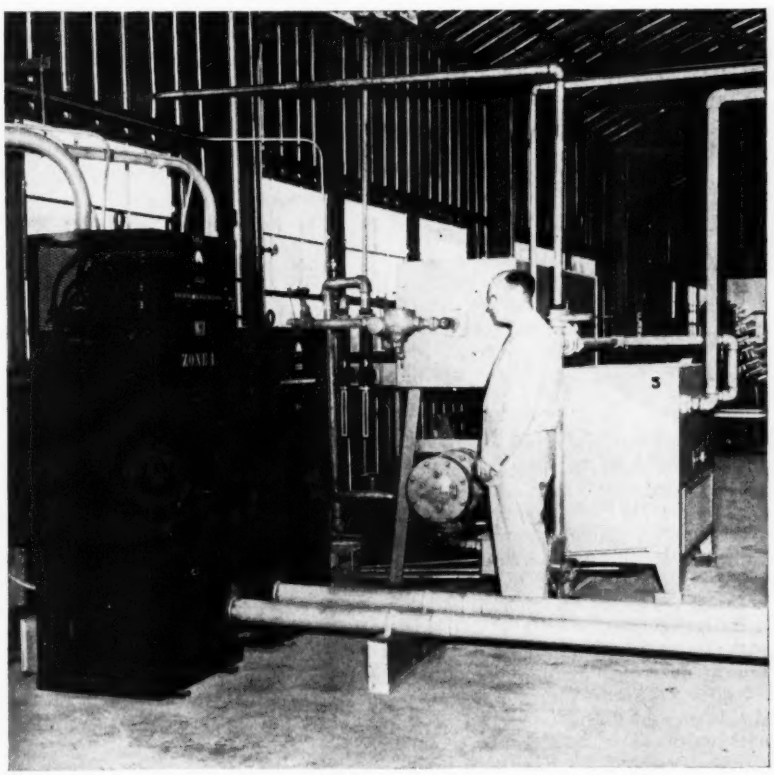
Ed Vermere says: "Powder metallurgy produces parts at a cost competitive with die or sand casting. The parts, however, are far superior to those formed by the casting methods. Our parts are formed with a mixture of iron and copper powders, a mixture that gives them ductility far superior to cast parts. When the part comes out of the sintering furnace, it is ready to go. No gates, sprues or other excess metal. There is no need to polish the part for plating, just buffing will do. Less porosity permits better plating, the part having a density of 94%."

Vermere uses a Stokes model S-5, dual-purpose, cam-type press, with an upper and lower punch, and a core arm that can be either stationary or movable. Pressure is 50 tons. The compacts are being formed from a mixture of 39% copper, 60% iron and 1% lubricant. These compacts are relatively strong and can take a certain amount of abuse. Sintering for this particular mixture is done at 2,050 F, in an exothermic atmosphere.

Electric Furnace

The furnace is the latest model sintering furnace built by Lindberg Engineering and naturally is all-electric. The preheat zone is rated at 15 kw, maximum temperature 1,500 F and is heated by Chromel units. These units are steel sheathed to protect the nickle chromium wire from the lubricant fumes, since this zone is primarily designed for burning out the lubricant. The first heating zone is rated at 70 kw and the second heating zone at 40 kw. Maximum temperature of both zones is 2,100 F. Globar units are used. The water-cooled chamber is divided into three thermostatically controlled zones.

Two features of the furnace in connection with the Globar units are interesting. As Globar units age, their resistance increases (an increase of about V3). To compensate for this, Lind-



Step-down transformers, atmosphere generator used for furnaces in powder metallurgy

berg uses a hand-operated tap changing transformer for each high heat zone. The other feature is a built-in tester that reads the voltage across each Globar unit. Determining the condition or exact location of any burnt-out unit is easily done with the selective tester.

The furnace is a continuous type and uses a mesh belt 20 in. wide. The preheat chamber is 60 in. long, high-heat chamber is 8 ft long and 10 in. high, the cooling chamber is 24 ft long. Over-all length is 62 ft. Capacity is 600 lb an hour, enough to handle the output of three presses.

Atmosphere Control

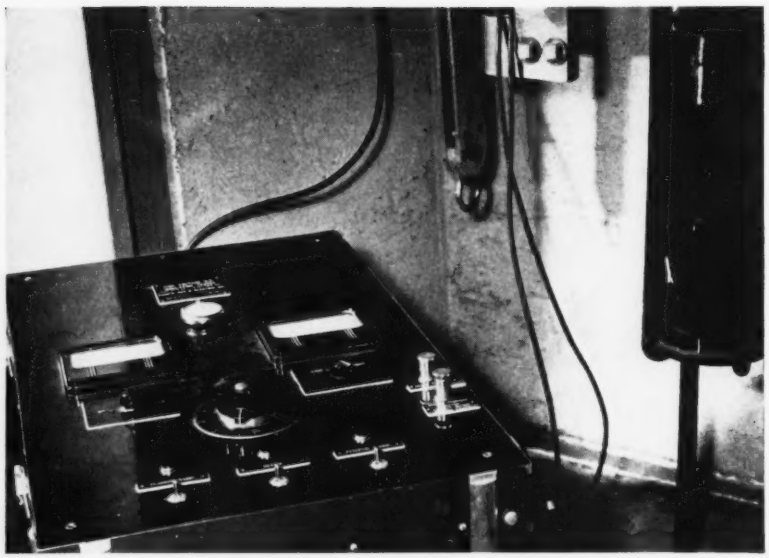
Control of the atmosphere in the entire sintering furnace is very important. Vermere uses a Lindberg HYEX generator, with the strongest reducing atmosphere being composed of CO_2-4%, CO-12%, H_2-18% and N_2-66%. As the atmosphere leaves the generator, the dew point is lowered by a refrigeration unit to 40 F.

Ed Vermere is a real old-timer in the metal-forming business and has been die casting since 1926 in Los Angeles. The shift to powder metallurgy demonstrates his desire to keep up with new methods and, since the method is so new to the West, he has shown a willingness to be a trail blazer in finding the way through an entirely new set of problems.

Electronic Nose

An "electronic nose," called the Tritilog, that can detect and measure sulfur compounds in gases to a sensitivity of one part in 10 million is now available to industry — another contribution of electronics. The Tritilog, developed by the Consolidated Engineering Corp. of Pasadena, is actually a chemical-electronic instrument with a sensitivity far greater than that of the human nose.

• **Electrical manufacturers** are spearheading the drive to automize industry. Westinghouse has a special custom-made trailer on national tour. It is a combination stage, auditorium and exhibit hall where it is shown how common electrical devices can be used to bring about successful automation of industrial machines. The coach is taken to customers' plants and other interested groups with consecutive 1½-hour programs for groups of 10. Movies and demonstration cover automation economics and mechanics. The coach completed its Far West tour Sept. 11 at Geneva, Utah.



D-c high-voltage test measures insulation values without danger of premature puncture

D-C High-Voltage Testing

The high-voltage d-c test* for determining insulation values of utilities' rotating equipment has progressed to the point where this type of test can be used now in industrial plants with equal success. Advantage of the high-voltage d-c test over an a-c high-voltage test is that with the d-c method condition of the insulation of a machine can be determined without danger of puncturing the winding and causing damage.

The high-voltage a-c test is usually made by applying 150% rated voltage and is sort of a kill-or-cure proposition. Premature breakdown will occur or else the piece of equipment will withstand the overpotential. In the latter case there is no indication as to the actual condition of the insulation, its probable life or when a rewind may be needed.

The D-C Test

The d-c test, on the other hand, is made by increasing the voltage in steps and reading the leakage current on a microammeter until the current curve reaches a knee and starts to rise abruptly. At this point the test is stopped to avoid breakdown of the insulation. From such curves the a-c breakdown potential can be determined quite accurately.

The high-voltage d-c test is so superior to any other method, in the opinion of engineers of the Pacific Gas and Electric Co., that this large utility now uses the test as the sole criterion for determining the necessity for rewinds on its generators, synchronous condensers and high-voltage motors. More than 3,000,000 kva of rotating equipment have been so routine tested.

Equipment Needed

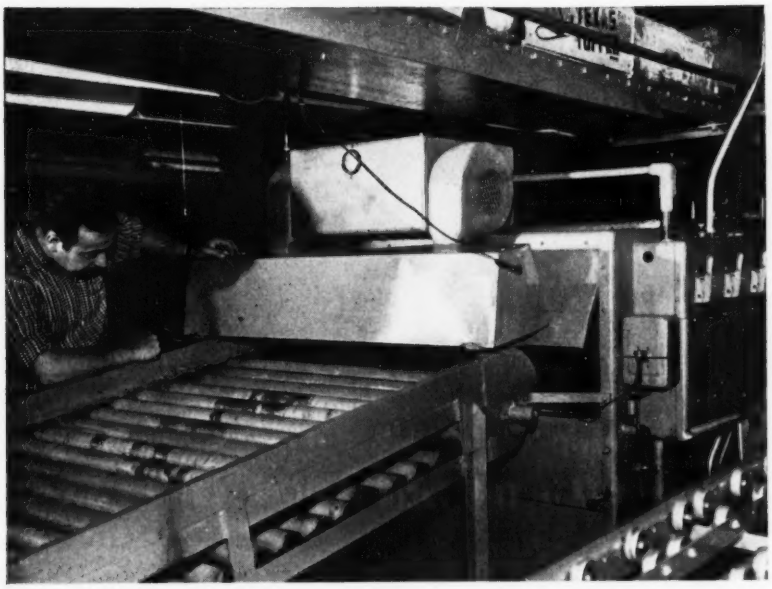
The equipment needed is light in weight, compact, relatively inexpensive and simple to operate. High-voltage a-c from a step-up transformer is rectified by a half-wave rectifier and applied to the test circuit through a microammeter with a high-voltage d-c voltmeter across the circuit. A variac in the primary, or low-voltage side of the transformer, permits varying the d-c high voltage from zero up to 40 kv, in the case of the PG and E equipment.

The test set illustrated weighs approximately 90 lb and is about the size of a two-suiter piece of luggage. Such test sets are now available commercially.

The high-voltage d-c test should find wide application on rotating equipment of 2,300 v and above in steel mills, sawmills, flour mills, shipyards, power plants and other large industrial installations.

* See Electrical West, May 1952, p. 79; September 1952, p. 91.

Sterilamps Kill Tomato Bacteria



Packaged tomatoes last longer on the market after an exposure to ultraviolet radiation

At the packaging plant of the New England Tomato Co. in Los Angeles, ultraviolet radiation is being used to destroy bacteria, mold spores and other microorganisms present on the surface of tomatoes. The sterilizer unit, as shown, consists of a sheet-metal housing inside which are two 17-w, 34¾-in. Westinghouse cold cathode germicidal Sterilamps mounted approximately 10 in. above the conveyor line. An additional one-lamp unit is positioned above the conveyor line at the entrance to the sterilizer. After leaving the sterilizer unit the tomatoes are sorted, graded and then packaged for the market in Celanese acetate overwrap.

This installation is being written up not to be patterned after, because it is not entirely effective in its present form. Rather, it is because of the great possibilities of ultraviolet radiation in the food industry and moreover because, with a few modifications, the installation could be made to do the job intended.

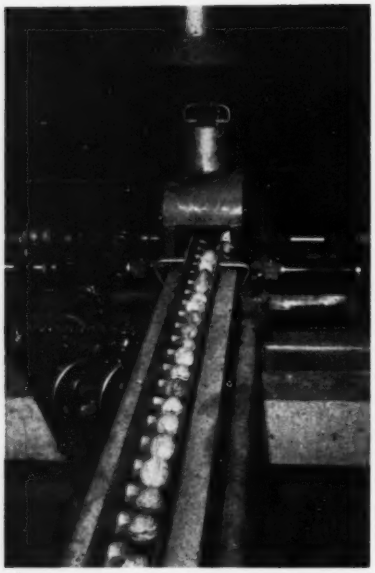
An electrical engineer experienced in such matters who inspected the installation had this to say: "I do not consider the single sterilizer unit adequate for the job. In the first place, the undersurface of the tomato is not exposed to the ultraviolet in the station and, second, after leaving the sterilizer unit the tomatoes are individually handled by workers in sorting, grading and packaging so that any sterilization achieved is nullified by the after operations. If additional sterilizer units were installed at the packaging station the system could become effective as far as decontamination is concerned."

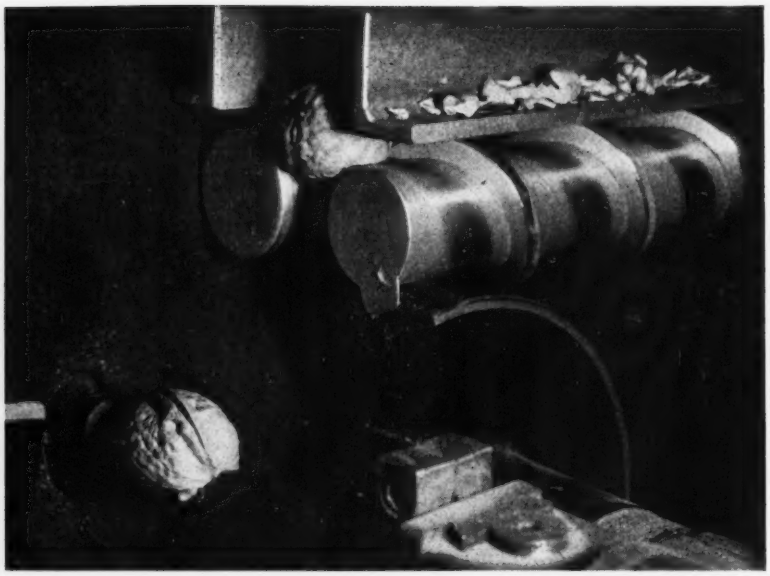
Electric Level Indicator Makes Inspection Automatic

Out goes beer can if liquid does not close circuit in contact arm as it dips into can

Automatic checking of the level in beer cans is performed by this machine in the plant of the San Francisco Brewing Co. As the cans pass along a conveyor after leaving the automatic filling machine, the curved spokes of a wheel, moving at the speed of the can, dip down into the can about half an inch. There is a pair of electrodes on the end of each spoke. If the contacts dip in beer or foam, the can is properly filled. If no contact is made in the 24-v operating circuit when the electrodes are lowered into the can, a solenoid operates an air valve and the can is air-blasted out of the fast-moving canning line.

The machine, developed by the American Can Co., eliminates the need for visual inspection and catches the occasional can that is not properly filled by the automatic filling machine. This installation, said to be the first of its kind in the West, suggests similar applications in food canning.





Nuts travel along conveyor at left into firing chamber shown at right with hood removed, are caught between electrodes and . . .

Lightning Impulses Shell the Walnuts

With a new electric walnut cracker a crew of 60 now handles the same volume of nuts as 100 did previously with the old cracker

Shelling walnuts with lightninglike discharges from a bank of capacitors is now a commercial operation at the plant of the Northwest Nut Growers in Portland. This machine, the only one of its kind in the world, was used by the cooperative to crack last season's walnut crop.

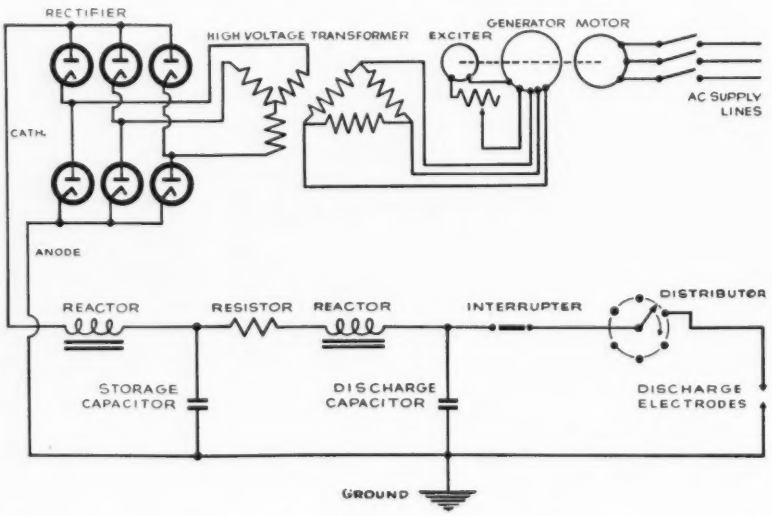
With the electric cracker the nuts are shelled faster, are of higher quality and there is less damage because of chafing and unnecessary breakage. The electric cracker cracks 1,200 lb of in-shell walnuts per hour at the present rate, which is only about one-third the possible speed. The old crusher-type machine cracked only 800 to 900 lb per hour. A crew of 60 now handles the same volume previously handled by a crew of 100 operating behind the old cracker.

In the electric cracker, nuts dropping from a screw-type conveyor at short intervals are caught between two electrodes as they fall. The shell is then shattered by a discharge current having a maximum value of about 5,000 amp and a duration of approximately fifty-millionths of a second. Output of a 60-hp m-g set is stepped up by a transformer bank, rectified, passed through wave-smoothing reactors and stored in a bank of capacitors. A distributor, similar to that on an automobile, times the impulses in two banks of nine cracking units each. The accompanying wiring diagram shows the electrical circuit.

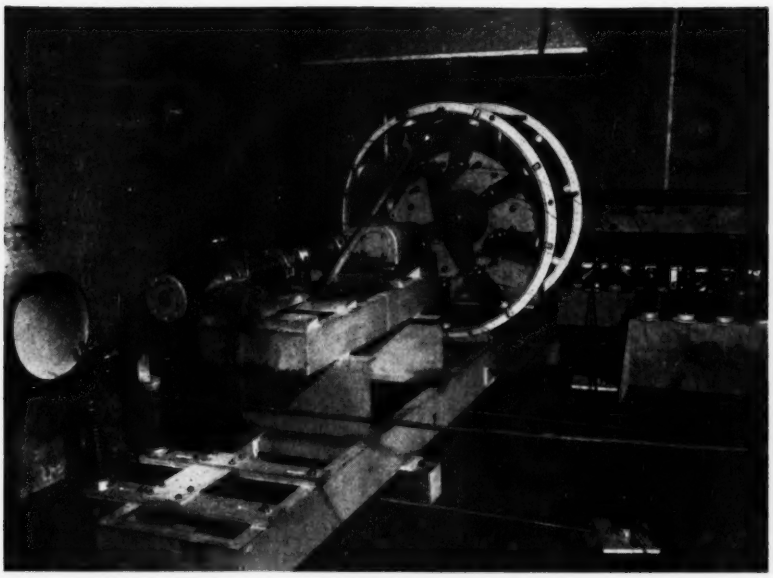
M-G Set—The primary purpose of the motor-generator set is to isolate the high-voltage surge circuit from Pacific Power & Light Co. lines, the serving utility.

High-Voltage Transformer — Consists of 50-kva transformer bank to step up voltage of m-g set to the high voltage applied to kenotron rectifier tubes.

Rectifier — Six Westinghouse WL 616 kenotron rectifier tubes connected



Circuit diagram for walnut cracker. About 5,000 amp at 65,000 v appear at electrodes



This is the high-voltage distributor that controls the firing impulses for a bank of nine crackers. At right, kenotron rectifiers

for three-phase, full-wave operation.

Reactor — Rectified direct current flows continuously through a wave-smoothing reactor.

Storage Capacitor—Energy stored in storage capacitor charges the discharge capacitor through resistor and iron-core reactor.

Resistor — Primary function is to make circuit loop nonoscillatory.

Interrupter — Interrupter switch is quickly opened after capacitor is discharged. This permits the recharging of the discharge capacitor immediately after surge discharge occurs. Second function is to produce high precision in the firing circuit by virtue of high velocity of its moving electrodes.

Discharge Electrodes—When interrupter switch and distributor switch are closed simultaneously, the voltage that appears across the discharge electrodes (65,000 v) is sufficient to cause breakdown through the shell, between the stem and blossom ends that shatters the shell, leaving the meat halves largely undamaged as to original shape and wholly undamaged by reason of the process.

So far the machine has been used only to crack walnuts but it is hoped to extend its application to filberts as well.

Small parts are decontaminated by ultraviolet prior to sorting

How UV Purifies Small Parts

R. B. Hatfield
Lighting Consultant
Southern California Edison Co.

Danger of infection and illness to workers handling contaminated articles that they process is reduced by high-intensity ultraviolet decontamination units in the plant of Industrial Aids Inc., Los Angeles. The concern's business is reclaiming valuable small miscellaneous aircraft parts for reuse by the aircraft assembly plants. The various parts, mainly small nuts, bolts, screws and rivets, received by the company are reclaimed by means of a series of sorting and inspection tables.

With the application of ultraviolet to the nuts and bolts, it is estimated that approximately 70% decontamination results. A dual, high-intensity hooded unit is installed over the initial sorting belt. This unit is located outside the main plant and the greater part of the employees do not see the process. Realizing the importance of the psychological effect on the employees, it was decided to install smaller, individual ultraviolet units at the head of each of the final sorting tables. One of these is shown. The constant glow of the ultraviolet unit serves as a reminder to the women that the materials are being decontaminated, hence they willingly handle the parts.

The external unit is a hooded dual T-6 high-intensity unit using two 36-in. tubes. For the conveyor inspection tables, hooded single WL-30, 18-in. units are used. Both types were supplied by Pacific Ultra-Violet Products.

Packaging machine puts stretchable plastic envelope around cans

Packaging Is Merchandising Aid

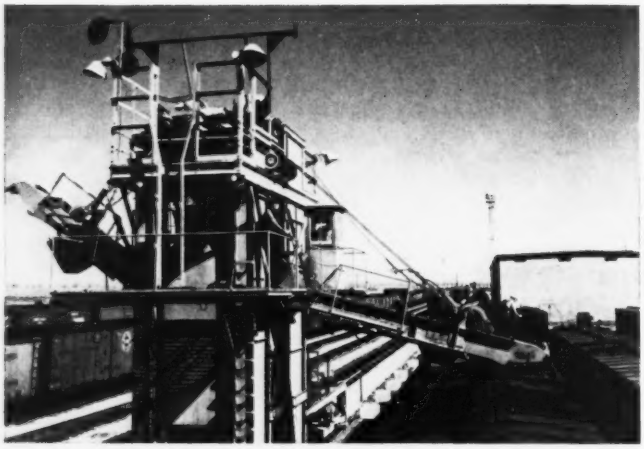
U. G. Karrer
Industrial Engineer
Pacific Gas and Electric Co.
San Francisco

Packaging is one of the important steps in merchandising. The San Francisco Brewing Co., makers of Burgermeister beer, fully cognizant of that fact, has taken advantage of a machine coming out of the electronic age to produce a handy six-can carry-away package.

The machine shown carries two rolls of stretchable plastic tubing, printed and folded flat.

An electric eye controls a cutter that cuts plastic envelopes about 6 in. high, sized to retract around six cans of beer when released by a stretching mechanism. The machine automatically has assembled the six cans in egg-crate cardboard, which later is used by the purchaser for a snap-in carrying handle.

It is a clever idea and another example of what electrically and electronically operated packaging machines can do for industry.



Ice cakes leave the storage vaults on conveyor belts, right. Centrally controlled traveling machine at left distributes the crushed ice

Here's How Freight Cars Are Iced at Rate of One per Minute

The large demands for icing freight cars during the Grand Junction, Colo., region peach season led to the development of a pair of icing machines by the Denver & Rio Grande railroad. The fast, efficient and labor-saving devices are capable of icing a car per minute.

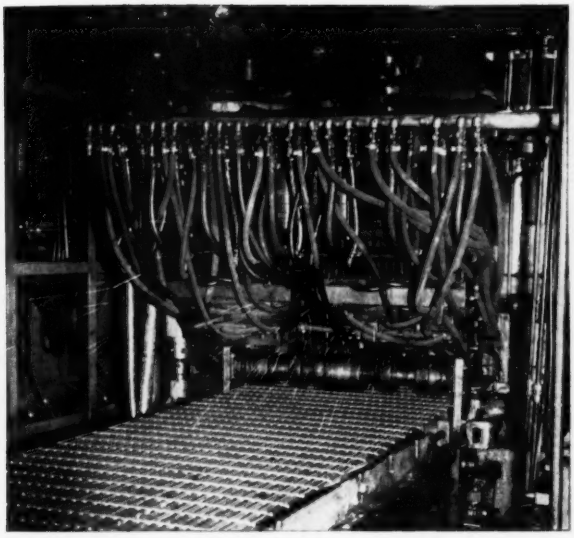
Dual controls of each machine are on the second unit from the top permitting visual observation of loading. Operators have complete control of the ice from storage vaults to cars. Two 20-hp motors supply traction along 1,800 ft of track for each machine. A 50-hp motor operates a machine blower for top icing. Correct percentages of salt are added automatically from the storage bunkers within the icers.

Electricity is supplied by a trolley duct extending under the dog walk, and consists of 440 v, 230 amp, three phase.

The 300-lb cakes are stored in the D&RG ice house which has a capacity of 16,000 tons. A daily storage house holding 400 tons is located next to the machine operating site.

Operators phone to any of the six daily storage vaults for the amount of ice needed. Cakes are set on a conveyor powered by a 10-hp motor and drop down a spiral chute to another conveyor that carries the ice under one set of tracks to an elevator. A 15-hp motor supplies power for reducing size and lifting the cakes to a four-section, 3,600-ft conveyor. Rake-ins divert the ice into the machines where it is crushed and carried on an endless, vertical scoop conveyor to the hatch chutes. For top icing, the cakes are ground to "snow" and blown into and on top the shipment through a four-inch hose.

Each machine can average 20-ton loading per hour. Combined motor horsepower is 127½. Service is supplied by the Public Service Co. of Colorado.



Bars entering machine edgewise are cross welded with three bars in single operation and out comes a panel of steel subway grating

Subway Grating Is Gang Welded Electrically to Speed Operation

Four hundred sixty welds a minute are made on subway grating in the plant of Irving Subway Grating Co., Oakland, with the hydraulic gang welding machine shown. The welder, made by National Grate Welder, requires 2,100 kva at 440 v, three phase. Step-down dry-type transformers, 440 to 6 v, are mounted directly on the machine. Ignition tubes control time and temperature of the welds.

The grating being produced at the time the accompanying photographs were taken, which happened to be for the new Pittsburg plant of Pacific Gas and Electric Co., consisted of 31 bars of flat steel strip, cross welded about every 3 in. with round steel rods. These cross rods, made up in sets of three rods each, are fed into the machine under the welding head. A button is pressed, the welding head is lowered and all 93 welds are made at once under hydraulic pressure.

This type of machine-tool production is possible only with an electric welder. PG and E serves the welder.

Remote meters and gages are read with closed-circuit television

Read Those Gages by TV

Closed-circuit television can do for industry what it is doing in the new Etiwanda steam plant of the Southern California Edison Co. On the main control board there are three Utiliscope TV screens. One shows water level on boiler indicators. The other two show fires on both sides of the furnace. Boiler-turbine unit 2 at Etiwanda will have the same setup. Similar TV units will be installed at Redondo No. 2 and El Segundo plants of Southern California Edison Co.

The advantages of closed-circuit television for remote indications may be seen easily when it is considered that the latest previous scheme was to use a complicated set of mirrors to reflect the gage reading some five stories down to the operating level. This necessitated special structural design in order to provide an unobstructed path for the light beam.

There are those who express surprise that there are not more applications of closed-circuit television in the Far West, considering its obvious advantages. They point out that there are numerous manufacturing plants and process industries where TV would have great economic value. It is one of the early steps in automatization of industry, they say.

Electric Heat Prevents Pond Freezing

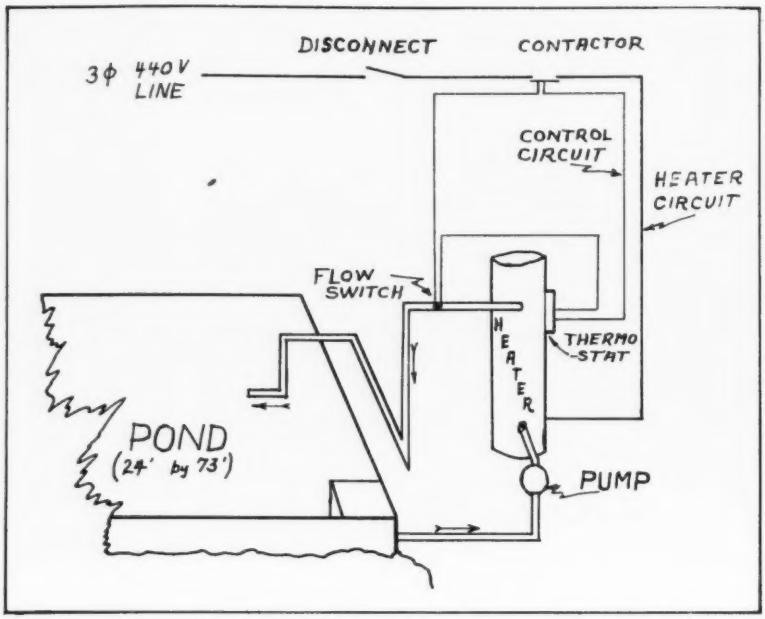
W. H. Clark
Industrial Engineer
Washington Water Power Co.
Spokane

An artificial sawmill pond 72x24 ft threatened to be the bottleneck that would, by freezing, close the mill in winter. Agitation alone would certainly not be adequate in the severe winters of this region. Electric heat proved to be the most economical over-all, through low initial cost and negligible labor costs. To hold operating costs down the system was designed for off-peak mill operation, the pond water providing ideal heat inertia properties. Thus the heaters could be operated from mill shutdown at night until just before mill startup in the morning and eliminate the demand charge for this load.

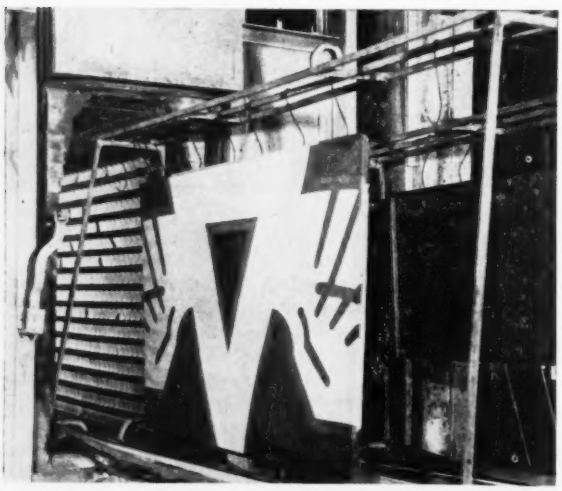
To determine the amount of heat necessary to prevent freezing, experimental data on stock trough water heaters were used, applying the same kilowatts per foot of exposed area found necessary for the stock ponds under these same climatic conditions. Approximately 50 kw were required. For method of application, tank-type heaters in combination with pumps and flow switches for protection seemed the most desirable as the alternates called for electrical equipment within the pond where logs were dumped. Two 24-kw heaters piped to operate either together or independently were used. The recommended operation was manual; using none, one or both of the heaters on any particular night.

The installation has proved to be both adequate and economical. In the past, usually in mild winters, only one of the heaters was used, giving indication that the two heaters will suffice for any condition. One bug encountered is priming in the heaters from the excessively dirty pond water. Tentative modification plans call for a closed coil of pipe in the tank through which warm clear water from the heaters would circulate.

The basic plan has proved itself in an area where –20 F temperatures are common and should certainly prove adaptable in a milder climate.



Schematic for electric heating of sawmill log pond to prevent freezing in the winter



Large sign enters electric furnace for baking of porcelain enamel

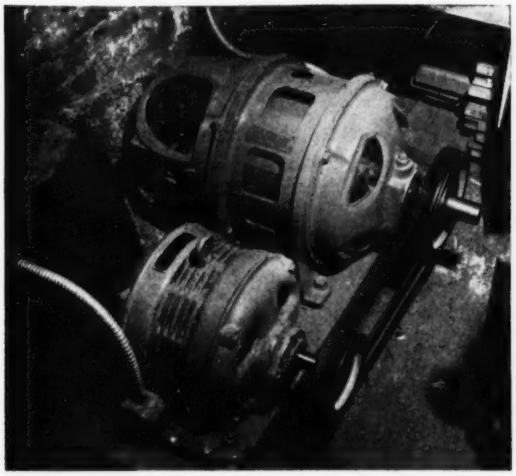
No Flaws, No Rejects

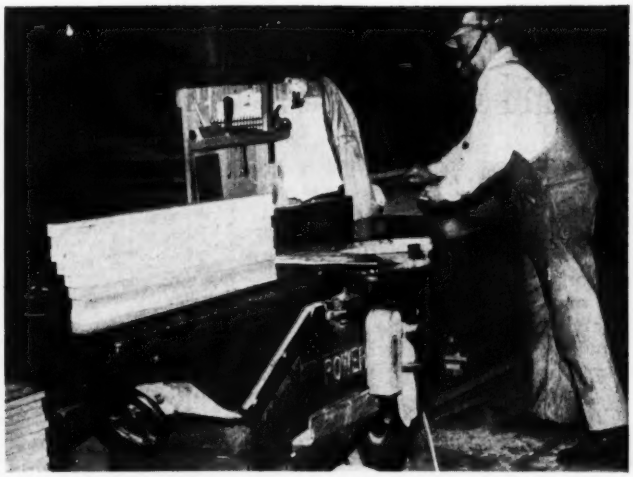
• Porcelain enamel finish of the highest quality is being produced in two electric furnaces at the plant of Payne-Mahoney Inc., Oakland. Superior product, absence of flaws, rejects and contamination of foreign particles from combustion-type furnaces are chief advantages of the electric furnaces, states Denis Mahoney.

The larger of the furnaces, the one shown, has an electrical capacity of 300 kw and will handle pieces of material, like signs, 5 ft high and 12 ft long. Chromel type A, high-temperature elements line each furnace wall. Elements operate at 2,000 F to give a controlled furnace temperature from 1,300 to 1,800°. Curing or baking time for the large portion of a sign, shown, was 2½ minutes at 1,550°. Close temperature control of the electric furnace permits accurate control of color, another advantage.

Furnace walls consist of 18 in. of insulating material and 9 in. of refractory, making a total thickness of 27 in. With this thickness of insulation, only possible in an electric furnace, it is unnecessary to fire the furnace during the eight hours in 24 that it is shut down and on week ends. Fuel-fired furnaces must be fired during these off periods to prevent cracking and spoiling the refractory.

A second furnace of 240 kw capacity handles smaller pieces and odd shapes. Pacific Gas and Electric Co. is the serving utility, Jerry Hirsham the industrial engineer.





Stepping up frequency with m-g set from 60 to 100 cycles speeds up jointer in carpenter shop to solve a production bottleneck

Higher Frequency Ups Jointer Output

W. L. King
Industrial Engineer
Washington Water Power Co.
Spokane

A small jointer at the Spokane Woodworking Co. was a bottleneck in the orderly process of millwork. In some way the output of this machine had to be doubled. To add more knives to the cutting head was practically impossible; to speed it up by pulley sizes and rearranging the direct drive was not easy to do; to add another machine and operator was impossible because of limited space.

Changing frequency to 100 cycles was the method adopted to attain the desired output. Tom's Electric made an installation of motor and frequency changer. A 5-hp motor running this generator was just right to run the 3-hp motor on the jointer. Since part of the equipment furnished was not new, but in perfect shape, Tom's made the complete installation including the contractor's wiring cost for less than $500.

One of the accompanying pictures shows the jointer with no apparent change. The other view shows the motor-generator installation in the basement under the jointer in the Spokane plant.

Results were most satisfactory and the customer is well pleased with the installation.

Salvaged waste will pay for hog fuel grinder in three years

Hog Makes Mill Refuse Salable

M. S. Prestwood
Portland General Electric Co.

Burning of sawmill refuse was creating a fire hazard at the mill of the Pohlman Sawmill Co. near Portland and had caused the state fire inspector to place a ban on any further burning of sawdust, trimmings and slabwood. In order to dispose of this waste the mill installed a fuel "hog" and discovered a waiting market for what previously had been considered a waste product.

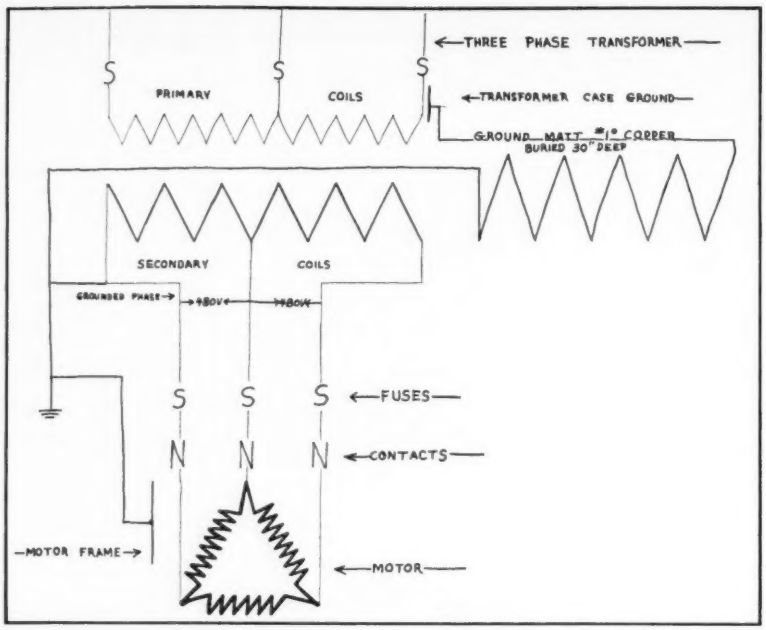
The 100-hp installation includes a 75-hp, 720-rpm, 440-v, direct-drive hog motor. The mill produced 5,000 bfm an hour using a 30-hp m-g set to power the headrig. This output produces an average of five units (a unit is 200 cu ft) of hogged fuel an hour. No maintenance has been required other than normal replacement of knife changes in the hog. This experience well illustrates another opportunity for turning a waste and nuisance into a most profitable business that, in this case, will pay for itself in three years.

It's Important to Ground Pump Motors

Pumping customers and contractors are asked by Idaho Power Co. to ground pump motors with sufficient capacity to clear any case of trouble that might occur. Where phase conductors are No. 2 or smaller, use of the same size conductor back to the utility's ground on the pole is recommended. Where phase conductors are larger than No. 2, then No. 2 is to be used for the ground.

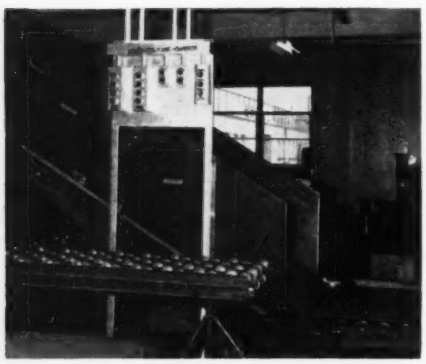
The assumption that pumps setting on a well casing and suspended in water constitute a good ground is erroneous. One fatality resulted from such an assumption.

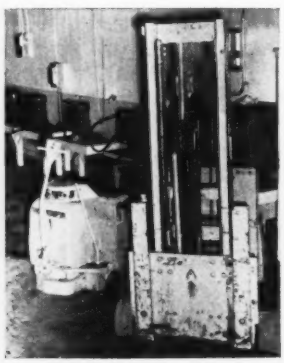
To assure adequate grounding, the power company permits the customer to use its transformer ground at the pole. At each transformer location, a ground is established by burying approximately 150 ft of No. 1/0 bare copper wire, 30 in. deep over an area of 20 ft square. Where three-phase transformers are used, this ground is connected to one phase. With single-phase transformers, the ground is connected to the midpoint, as shown in the diagram.

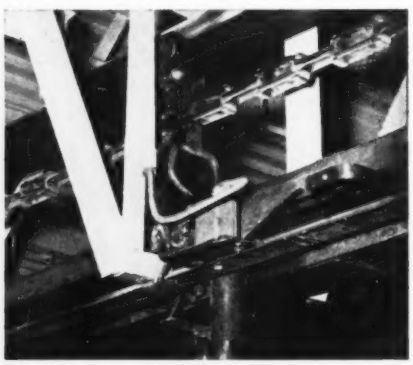


Frame of customer's motor, one secondary leg and transformer case tie to utility ground

Under the utility's grounding practice, voltage from phase wires to ground ranges from 240 to 480 v so that if the case of the pump motor is isolated a ground between the winding and the frame would create a hazard to life and property. Grounding the motor frame and other noncurrent-carrying parts to the utility's ground obviates this possibility.







Conveyor systems, fork-lift trucks and endless trolley conveyors are used to reduce material handling costs in new ZCMI warehouse

How Modern Material Handling Cuts Costs

Mechanism is to warehousing and material handling what the tool machine and automization are to industry. An example of the former is to be found in the new ZCMI Wholesale Distributors center at Salt Lake City. This Mormon Church enterprise took over one of the old small arms manufacturing buildings erected during the war, containing 406,000 sq ft, and converted it into a display and reception, general office, manufacturing and wholesale center.

Hand labor is kept to a minimum in the warehousing and wholesaling operation. There are 3,100 ft of conveyors; two endless-chain, trolley conveyor systems, 1,200 ft in length; seven fork trucks, one of which is automatic. Cross conveyors are interlocked to prevent pile-up of goods. Freight car unloading docks are engineered for efficient handling of cars and goods. Carts are used for assembling orders, and for the customers who are waiting colored baskets are used. So extensive is the warehouse area that bicycles and roller skates are used to speed personnel travel.

Some of this equipment is shown by the accompanying photographs.

The Reader AUDITED PAID ABC CIRCULATION *His Mark*

THE ABC that appears in the symbol at the top of this page stands for Audit Bureau of Circulations. The symbol itself is an emblem of cooperation, in which every subscriber to this magazine has an interest.

The Audit Bureau of Circulations is a voluntary, non-profit, cooperative association. It was founded in 1914 and now consists of 3450 advertisers, advertising agencies and publishers in the United States and Canada. This magazine is proud to be a member.

ABC originally was set up to help take the racket out of publishing, to eliminate the waste and guesswork then so prevalent in publishing and advertising, to establish order and confidence in place of the misunderstanding and misrepresentation that arose from unverified circulation claims and dubious circulation practices. Its mission was to protect the interests of both readers and advertisers.

THIS IT DID by first defining the term "paid circulation." Then it established standards and rules to govern subscription sales practices and records. Finally it set up an auditing organization to verify the claims and report the facts concerning the circulation of each member publication. It now maintains on that job a working staff of sixty-five full-time auditors. So the ABC symbol has become the hallmark of circulation standards and advertising values. Each member publication must maintain those standards if it wishes to retain its membership and display the ABC symbol.

This ABC audit is no perfunctory affair. When a business publication, such as this one, becomes a member of the Bureau, it agrees that the auditors shall have "the right of access to all books and records." Their inspection, therefore, may cover any part of its operations. Original subscription orders, payments from subscribers, paper purchases, postal receipts, arrears of payments, and many more items are painstakingly checked by the auditors. In many instances they go behind the records to seek verification from subscribers themselves as to the terms of their subscriptions.

IN DOING ITS JOB, ABC has created many values for both publishers and readers as well as for advertisers. That is because the publication that becomes a member of ABC thereby offers the strongest possible guarantee of its primary devotion to the interests of its readers. The function of a business magazine is to be useful to its readers. When this service is rendered by an ABC publication, it is constantly subject to the practical test of reader acceptance and approval. As each subscriber has the right to purchase or refrain from purchasing an ABC publication, that collective right confers upon the readers the power to say whether or not the publication will survive. Thus the report on its ABC audit provides the most direct assurance that a publication stays in business only because of a voluntary demand by readers who find its editorial service responsive to their needs.

Naturally, the editor of each business publication follows closely the score thus racked up by his paper in its ABC reports. In the scope and tone of his editorial coverage and treatment, in the selection and presentation of his editorial content, he must constantly labor to maintain and enhance the readers' acceptance of his efforts. That is why the editorial standards established by ABC publications set the editorial standards for all publishing. That is how the ABC constantly stimulates its member publications to become even more useful to their readers.

AND THAT IS WHY the ABC symbol has become the Mark of the Reader, a constant reminder that his willingness to pay for an ABC publication is the acid test of its value both to him and to its advertisers.

McGraw-Hill Publishing Company

ELECTRICAL WEST

Unleashing the Atom for Power

SECRECY and confusion seemingly obscure and retard electrical industry progress in developing atomic-powered electric plants in the very near future. As membership on the various "teams" working on such projects is reshuffled, rumors fly thick and fast as to plans, schedules, costs and other factors. Certain basic facts stand out. Experimental power piles of the breeder type are a reality. So too is the atomic powered submarine. A pilot atomic power station could assuredly be built tomorrow. What holds back further progress apparently is Atomic Energy Commission reticence to give the go-ahead signal and Congressional unwillingness to amend the original Atomic Energy Act. Some real industry leadership is needed to induce a more liberal attitude on the part of the AEC and to give Congressmen the information they must have if the law is to be changed.

Sell, *Sell*, SELL

FORECASTS of a slump in business in 1954 and 1955 (and here it might be observed that we can talk ourselves into a recession) tend to emphasize more than ever the need for an overhauling of the industry's sales techniques. For longer than anyone cares to admit, the arts and talents of the salesman have languished. People have had record incomes and the will to spend. Industry — ours in particular — has provided attractive goods. The result has been plenty of buying and very little selling.

One of the phenomena of what *Business Week* has designated as the "Changed American Market" is that this nation has become so rich and productive that the consumer can take or leave a very large share of what is produced with very little inconvenience. Some economists have put the range of this optional consumption up to 40% of our total production. This means that the consumer is under no compulsion whatsoever insofar as his immediate personal convenience is concerned to purchase a very large share of what industry is capable of producing. And many electrical items fall in that category.

Conceivably the difference between a depression and prosperity could depend upon the art of selling. The salesman, then, might truly be designated as the custodian of national prosperity.

Herein lies a challenge for the electrical industry, which in its day had no peers in the field of selling and promotion. It is time to build back that old-time enthusiasm and inspiration into our selling. The signs and portents are clear that in the days ahead we must sell, *sell,* SELL.

Talk Big and Back it Up

THAT was the admonition given by former Wyoming Governor Leslie Miller to the Rocky Mountain Electrical League convention. He went on to say what he meant by this is that the industry has an opportunity opened up to it to undertake big things again. The new administration, he felt, invites private enterprise to take the initiative instead of remain on the defensive. It should not let this opportunity go by default. Wherever a need for electric power can even be sensed, let alone asked for, private industry should find ways quickly to provide it.

For two decades the privately owned power industry has had to be on the defensive. The initiative for power development was considered the divine right of the government, which to further enforce this concept used all the agencies at its command to hinder and deny all privileges for constructing new capacity. Now that concept of government monopoly has been changed. The change may not sound like full freedom and certainly it is less than wished for. But at least the complete blockade has been removed and an indication given that if local power companies and municipals want to take the initiative they will not be hamstrung by jealous federal bureaucracies.

Initiative and enterprise launched the industry in days when government had no faith in the future of electricity. Let these American qualities emerge again!

EDITORIAL VIEWS

Curtis W. McGraw, 1895-1953

Everybody who knows ELECTRICAL WEST has known Curtis W. McGraw, president and chairman of the board of the McGraw-Hill Publishing Co. The enduring mark of his leadership in the task of keeping business well informed, shaping the technical development of industry and holding the nation to an awareness of its power for greatness and goodness must remain on these pages. But it is something out of the lives of all of us that he died last month in the very prime of a full, ennobling and beneficent life. He would have been 58 on Oct. 13.

Curtis W. McGraw

Born in Madison, N. J., he was a graduate of Laurenceville School and Princeton University, class of 1919. At Princeton he was president of his freshman class, captain of a football team that beat both Harvard and Yale and was active in basketball and other sports. His college career was interrupted by World War I. He enlisted in the infantry, went to an early officers' training camp and was commissioned a second lieutenant. He came out of the war a major and he was wounded in action in the Meuse Argonne offensive.

His publishing career began with the McGraw-Hill Book Co. in 1920. He was vice-president, treasurer and director of that organization from 1927 to 1950. He became vice-president and treasurer of the parent publishing company in 1947 and was elected president and chairman of the board in 1950.

Curtis McGraw's outside civic and business associations were legion, but the two positions he cherished most were president of the Princeton Hospital and membership in the Postmaster General's Advisory Board of the Postoffice Department.

Gregarious, generous and humanitarian, Curtis McGraw possessed those great qualities of leadership that kindle enthusiasm and inspire others to excel. Liking people, he was liked in return by the great and the small. He never sought prestige or power, but those things came to him automatically because he himself accepted any task, large or small, that came his way. Fritz Crisler, the great football coach, an especial friend of Mr. McGraw's, has said that the difference between a mediocre and a great football team is frequently one man whose innate qualities of leadership weld team spirit into an unbeatable force and yet keep in the game an element of fun. Such a leader was Curtis McGraw.

While he leaves behind thousands of empty hearts that grieve at the loss of a great and good friend, at the same time he leaves millions of minds better trained for their daily tasks in education, commerce and industry because of the intercommunication system of books and magazines that he directed. Curtis McGraw could ask for no better monument to his memory.

Steede Ingledow Robertson

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AIEE Reviews Electrical Developments

With a program international in flavor as befits an organization whose membership is drawn from engineers in many different nations, the Pacific general meeting of the AIEE at Vancouver, B. C., Sept. 1-4, brought forth timely and pertinent discussion of new electrical developments and problems in the U. S., Canada, Alaska, Ecuador and Sweden. Of particular interest to the 800-odd members and guests in attendance were sessions dealing with new hydroelectric installations and equipment, microwave applications to power systems, 345- and 400-kv transmission and circuit breaker design and ratings.

A sound economic and engineering settlement of differences between the U. S. and Canada over headwater storage benefits on the Columbia River was urged by Tom Ingledow, AIEE vice-president for District 9 and vice-president and chief engineer of B. C. Electric Co., at the meeting's only general session. Pointing out that upstream storage in Canada will add 35 billion kwh annually to the power output of Columbia River hydro plants in the U. S., Ingledow said politicians are poles apart over settlement for Canada's contribution. The U. S. has offered a single cash payment; Ingledow urged instead that a block of power be dedicated to Canada in perpetuity. He also pointed to British Columbia's burgeoning industrial expansion which, he said, would be stepped up by the early completion of oil and gas pipe lines from Alberta to the coast. B. C. Electric growth has paralleled that of the region, he said, having gone from 249,000 hp of installed capacity in 1941 to 605,000 hp today, with an additional 120,000 hp scheduled for completion in '54 and '55.

AIEE President Elgin B. Robertson of Dallas, Tex., reported that the institute's major problems stem from growing pains—the AIEE is now the largest professional engineering organization in the country. Even so, there is a falling off in student memberships, he said, at the same time urging closer relationships between sections and student branches. Admitting that little progress has been made toward nation-wide engineering unity as demanded by the membership, he said that the AIEE is not the transgressor in blocking the Engineers Joint Council from achieving that aim. He said that all engineers must make their wants known at the grass-roots level before real engineering unity will come about.

Canadian Hydro Development

Two papers of more than local interest dealt with hydroelectric development in British Columbia. One had to do with the Wahleach plant of the B. C. Electric Co.; the other covered the Kemano-Kitimat development of the Aluminum Co. of Canada.

Wahleach is designed for operation without attendants, said T. Ingledow and J. H. Steede, B. C. Electric Co. Supervisory control devices operated from the central office in Vancouver, 72 miles away, function to place the automatic starting relays in operation, adjust voltage and load, and stop the 82,000-hp machine. All functions, such as opening and closing the penstock valve, changing the governor load limit and operating circuit breakers, are carried out by supervisory control. Associated with the development, but designed for later extension to the company's Bridge River plant, 110 miles northward, is a line designed for 345-kv operation. This line, the first of its kind on the North American continent, is designed for two parallel conductors per phase. At present it is operating at 230 kv with only one of the two conductors. Full insulation has been provided for the higher voltage and hardware is in place to permit the second conductor to be added with a minimum of change when it is desired to operate at 345 kv.

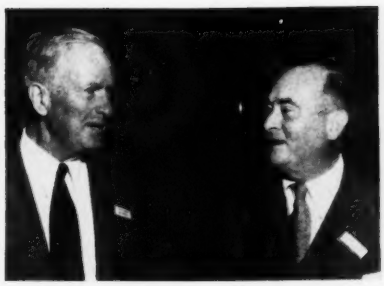
The Kemano-Kitimat development, 500 miles north of Vancouver, will ultimately develop 2,400,000 hp to operate the world's largest aluminum reduction works, said F. W. Lawton, Aluminum Laboratories Ltd. The project is notable for the third highest rock-fill dam in the world, one of the world's largest storage reservoirs, the largest underground house, the highest capacity multinozzle vertical impulse turbines, the first 300-kv power cables in North America and the unusually heavily loaded transmission lines with largest ACSR cable yet built.

Transmission Papers

Experience with Sweden's 400-kv transmission has been very satisfactory, reported B. J. Rathsman and G. Jancke, Swedish State Power Board. The first part of the line, 600 miles in length, has been in operation since April 1952. Only insignificant technical modifications are being introduced in subsequent extensions, the authors said. Using series capacitors, the transmission capacity of 300- to 400-mile single-circuit lines is raised from 400,000 kw to 650,000 kw, and later on to 800,000 kw. Transmission costs at 400 kv without series capacitors are about 65% and with series capacitors about 55% of those obtained in a corresponding 230-kv system without series capacitors, the paper states.

The successful use of shunt capacitors to increase power transmission on the Bonneville Power Administration system was reported by E. C. Starr,

Steede Wollaston



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Oregon State College, and E. J. Harrington, BPA. In the past few years BPA has followed an accelerated program of reactive installation, they said. At the present time a total of 872,500 kvar in static capacitors has been installed. This, with 507,000 kva in synchronous condensers, makes a total of 1,379,500 kvar or approximately one kvar for each 2.2 kw of power transmitted. Experience to date indicates satisfactory operation of shunt capacitors at levels up to 115 kv, providing care is taken to design the installation properly and select adequate switching equipment. It is believed that shunt installations at 230-kv levels are entirely feasible technically, using equipment on today's market. Development of low-cost 115- and 230-kv switchgear suitable for the service would make many more high-voltage installations economically attractive, said Starr and Harrington.

D-c transmission was discussed by J. G. Holm of Quito, Ecuador. Electronic converters and other necessary d-c equipment have not been fully developed, he said, and economic comparison of transmission costs must be on an estimated basis. Swedish tests in connection with d-c transmission of 20,000 kw at 100 kv by undersea cable over a distance of 62 miles, by the use of electronic converters, have given promising results and show the d-c system to cost considerably less than the a-c system, said Holm.

H. P. St. Clair, American Gas & Electric Service Corp., presented simplified curves, comprehensive and easy to apply, to promote a clearer and concise understanding of the comparative capabilities and performance of transmission lines at various voltages and distances. On the matter of conductors, he said that the tendency for surge impedance loading (SIL) to go up with increased conductor diameters should be added to the other advantages of using larger conductors, such as higher thermal limits, lower resistance losses and better line performance. The larger conductor provides, in addition, a definite increase in capability from the standpoint of inherent stability limitations, he said.

High-Voltage Breakers

High-voltage, high-interrupting-capacity circuit breakers came in for their round of discussion. C. J. Balentine and J. M. Milne, General Electric, described a further step in the development of a line of steel-clad impulse oil circuit breakers to fulfill industry requirements for increased interrupting ratings at 138, 161, 230 and 330 kv. The 230-kv, 10,000-MVA breaker described in the paper uses a new tank configuration resulting in an oil reduction of 40% over the conventional 230-kv round tank breaker while doubling the interrupting rating of that design. It allows over-all tank heights to be reduced so that it is now possible to ship 230-kv breakers with all three poles factory assembled and welded to a unit base. Tests have proved adequacy of design and indicate that higher interrupting ratings could be obtained with modifications, the authors state.

Another General Electric paper by V. E. Phillips and R. H. Miller dealt with the short-time impulse voltage characteristics of tank-type oil circuit breakers. They said: "Depending upon the type of protective device and physical arrangement of the station, short-time voltage surges having crests above the basic impulse level may be present and will require special consideration to insure insulation coordination." They concluded from tests made on a representative breaker that the short-time impulse characteristic of the complete breaker is comparable to that of the bushing alone.

R. C. Van Sickle, Westinghouse, attempted to answer the question: "Is the European circuit breaker rating system really more conservative than the American?" He said that a breaker to meet American standards and one to meet British standards, for the same voltage, rated normal current and rated interrupting capacity, meet different specifications. The American breaker must be able to withstand a higher insulation voltage test, to operate at higher average ambient temperature, to carry rated normal current with less temperature rise on the contacts, to close against higher short circuit currents, to carry short circuit currents longer and to interrupt symmetrical and asymmetrical currents up to a rated interrupting current equal to the rated symmetrical interrupting current of the British breaker.

The problem of oil circuit breaker design for switching 115-kv shunt capacitors was covered in a paper by W. M. Leeds, J. H. Pehrson and C. F. Cromer, Westinghouse. They said that recent experience switching 30,000 kvar in two parallel banks at 115 kv on the Bonneville system has indicated the special nature of the problem. It has become evident that not all types of circuit breakers will give satisfactory service in controlling the magnitude of switching surges and in particular limiting the high-frequency current surges exchanged between parallel banks with negligible reactance between them. The paper discussed certain oil circuit breaker designs suitably modified to provide satisfactory operation when switching high-voltage capacitor banks.

In a paper dealing with the location of series capacitors on high-voltage transmission systems, S. B. Crary and L. E. Saline, General Electric, reached these conclusions: The most economic and practical location of series capacitors is in the intermediate switching stations; for a 300-mile transmission, it appears impractical to switch out a portion of the capacitors in the intermediate station because the advantage is negligible compared to greater over-all complexity and decreased flexibility; for 600-mile transmission switching has greater economic benefits but still may be impractical for the same reasons.

Induction Generators

Two papers dealt with the induction generator installation at the Sullivan hydro plant of Portland General Electric Co. Jean V. Kresser, Westinghouse, and J. R. Downing, PGE, pre-

Gamble Cutter

McMillan Cone

Peterson Anzini

sented a wealth of information on induction generators, gave their advantages and disadvantages, and described the recent Sullivan plant installation in some detail. Such machines are ideal for automatic operation, the authors stated, because fewer supervisory or automatic functions, or both, are required since there is no exciter, brushes, regulator or d-c equipment required; switchgear is simplified, machines are not easily overloaded, overspeed is less hazardous, there are no rotating windings or slip rings and no synchronizing equipment is required. Generated voltage has excellent wave shape and induction generators act as harmonic suppressors. There is no sustained short circuit contribution, reducing circuit breaker rating, although momentary rating may be affected. Principal disadvantage is low power factor. The authors see a wider field of application for the induction generator in automatic or remote control plants whose capacity is small compared to system capacity and possibly where stream flow loading can be used.

The other paper by J. G. Kirwan, Westinghouse, and W. D. Smith, PGE, dealt specifically with the automatic control of the Sullivan plant machines. They concluded by saying: "The possibilities of economical operation using induction generators should open the way to reconsideration of many small hydroelectric sites. Similarly, modification and automatization of many existing stations may be undertaken to advantage using induction machines."

Protection

Three papers dealt with relaying and protection. M. A. Bostwick, Portland General Electric, presented some new thoughts concerning the combined use of the mutual drainage coil and neutralizing transformer as a means to improve the reliability of pilot wire relaying.

A. W. Adams, BPA, and F. R. Bergseth, University of Washington, described a simplified unit for distance relaying. By building a suitable control unit employing a transfer relay and timing units, they said that it is possible to use the less expensive single-zone distance relay to give two-zone protection to a transmission line.

Characteristics of split-phase currents as a source of generator protection was the subject of a paper by H. R. Sills and J. L. McKeever, Canadian General Electric Co. An internal fault in a multicurrent stator winding of an a-c generator will cause a current to flow between the parallel circuits of the winding. This characteristic has long been used for the split-phase protection of generators. Such protection is simple and reliable. The authors presented a summary of tests and experience as a guide to the potentialities and limitations of this form of protection.

M. J. Lantz, BPA, gave a paper dealing with the effect of fault resistance on ground current. He said that the inclusion of tower footing resistance in faults on high-voltage systems may result in substantial reduction of ground fault currents. The introduction of effective values of resistance in the fault circuit at system points of large generation will result in rapid attenuation of the d-c component of fault current. This will require circuit breakers to open only symmetrical currents, further reducing the magnitude of current to be interrupted.

Experience has shown that patrolling transmission lines by light helicopters is more economical, faster and superior as to inspection detail than by ground patrolling. This conclusion was reached for conditions on the federal system in the Pacific Southwest by L. M. Alexander, USBR, Boulder City, Nev., and O. K. Mangum of USBR, Phoenix, Ariz. Maintenance crew man-hours and loss of revenue are lessened by using helicopters to locate line trouble promptly and direct repair activities. Based upon the success of the helicopter for patrol, a study was made of the feasibility of using an eight-passenger, 1,500-lb payload-carrying transport helicopter for transmission line maintenance and repair work. This study showed the technical feasibility of the transport helicopter. Its relatively great speed and mobility make possible a major reduction in line crews, truck drivers and road maintenance crews, with corresponding reduction in equipment; increased continuity of service; a substantial saving in annual cost of maintenance and repair; and improvement in customer service.

Connectors—Aluminum Sheathed Cable

A four-year research project devoted to the problem of copper-to-aluminum and aluminum-to-aluminum connections under normal and extreme field conditions was reported by D. C. Hubbard, R. W. Kunkle and A. B. Chance of the A. B. Chance Co. Superiority of heavy tin and fortified cadmium platings on fittings was noted from tests on aluminum-to-aluminum and copper-to-aluminum connections.

The use of seamless aluminum sheathing for pressurized cables imparts certain very distinct advantages to the cable design, stated F. O. Wollaston, B. C. Electric, and H. D. Short, Canada Wire & Cable Co., in describing an aluminum sheathed, type S-A gas pressurized 69-kv cable installed in Vancouver. The Murrin-Dal Grauer transmission line cables mark the second Atkinson-Fisher-type cable in Canada and the second commercial application in the world of aluminum sheath at high internal pressure. The Atkinson-Fisher principle of void control by pneumatic pressurization allows a gas to become an intimate component of the insulant. Gas as such is almost a perfect dielectric but can rapidly become a conductor if a sufficient electric field is present. It is only a matter of applying empirical data to sound engineering to bring under control this transitional state of affairs in a high-voltage cable design. The ultimate design of this type of cable has not been attained yet, state the authors, although the adoption of aluminum sheathing is unquestionably a major step in this direction.

Another report on the high-voltage d-c testing of insulation in rotating

equipment was presented before an AIEE Pacific general meeting. This time it was a paper on techniques and examples by C. L. Sidway and B. R. Loxley, Southern California Edison Co. Several investigators, they said, have reported results of high-voltage testing indicating that ultimate failure could be nondestructively predicted with such dependability that at least one large utility is using d-c testing exclusively. (Editor's note — This is Pacific Gas and Electric Co.) The d-c test is made by applying, in steps, a rectified high d-c voltage and measuring leakage current with a microammeter. Characteristic curves show a gradual increase in current until a knee is reached, beyond which the current rises abruptly and puncture results if voltage is increased. Safety lies in the fact that the test may be stopped before this happens. The authors conclude that failure prediction reliability may be increased by obtaining a large number of points, with smaller voltage increments as failure is approached and continuing the test to as high a voltage as practical. Their tests indicate that a d-c to a-c ratio of 1.8 will generally be as searching as a one-minute a-c test at 150% of operating voltage. No service failures have occurred on 3,146,000 kva of Edison rotating equipment with the present practice of routine a-c testing and the authors say that equivalent dependability with the new d-c test method is not at this time apparent. They agreed, however, that the d-c method has many advantages that make its continued use desirable.

C. L. Moses and A. A. Johnson, Westinghouse, recommended a d-c to a-c ratio of 1.6 as a minimum. C. E. Kilburn, General Electric, warned that testing with d-c voltage at two and one-half times the standard 150% a-c test may damage windings before signs of failure appear. R. W. Wiseman, General Electric, cautioned that d-c testing may be more harmful than a-c to some windings that may have picked up foreign materials. Leslie Hill, Pacific Gas and Electric Co., said that d-c tests will reveal weaknesses that are not shown by a-c high-voltage or power-factor testing.

Several Bell Telephone papers dealt with developments in the communication field. Others discussed problems of the industrial plant electrical engineer.

General meeting Chairman J. H. Steede and his committees were universally commended for the excellence of the technical program and the splendid convention arrangements.

The next Pacific general meeting will be combined with the summer meeting and will be held in Los Angeles June 21-25, 1954.

Panorama of the PCEA

The Administrative Services Section's program, approved by the PCEA's board of directors and now underway, covers the field fully and includes some new work not previously undertaken by this section.

Chairman George Coughlan Jr., PG and E, and Vice-chairman J. T. McNab, Arizona Public Service, report that the successful practice of working with and holding joint conferences with the PCGA will be continued this year. Eight discussion groups have been established, which will be divided into two conferences. Four groups will meet at the Hollywood Roosevelt Hotel Nov. 12 and 13, 1953, and the other four will meet at the Hotel Claremont in Berkeley, April 7 and 8, 1954.

The program for the November conference in Hollywood will include:

1. **Mechanized Accounting Potential**—present and future possibilities in mechanized accounting, sponsored by J. L. Liecty, Arizona Public Service Co.

2. **Right-of-Way and Land,** sponsored by R. E. Davis, Southern California Edison Co.

3. **Clerical Manpower Standards,** sponsored by Carl Weiss, Southern California Gas Co.

4. **Customers Accounting Activities,** sponsored by Jack Leaman, Southern Counties Gas Co.

Subjects for the April conference in Berkeley are:

1. **Contract Procedure, Formulation and Administration**—general conditions incorporated in general contract and equipment purchase specifications, sponsored by E. V. Noe, Pacific Gas and Electric Co.

2. **Purchases and Stores,** including stores accounting and traffic control, sponsored by A. A. Charronat, Pacific Gas and Electric Co.

3. **Internal Auditing,** sponsored by I. L. Comstock, Coast Counties Gas & Electric Co.

4. **Accounts Payable**—practices and procedures, sponsored by N. J. Blaney, Southern California Gas Co.

Four committees appointed last year have been reappointed to continue their studies. J. S. Green, Southern California Gas Co., is chairman of the study of NARUC uniform system of accounts. The insurance and claims committee is headed by T. R. Salm, PG and E. Chairman of the working cash requirements committee is R. N. Dreiman, Coast Counties Gas & Electric Co., and E. J. Wright, San Diego Gas & Electric Co., is chairman of the committee on preservation of records. In addition to its regular work, the committee on preservation of records has been asked to submit recommendations for safeguarding important records and to endeavor to classify member company records to coincide with titles contained in "Regulations to Govern the Preservation of Records."

James Bridwell has been appointed chairman of a new management level committee to study the functions of Penniless Accounting, possible application thereof, practicability, and savings to be effected by its adoption.

The transportation and automotive equipment discussion group has been transferred to the Engineering and Operating Section.

At its last meeting the guidance committee of the Engineering and Operating Section decided to hold its general conference next spring in northern California. Some time after the conference a test meeting will be held in Phoenix to determine whether or not successful regional meetings—such as those conducted last year by the Business Development Section—can be developed in this section.

Again this year the Business Development Section will sponsor a series of district meetings throughout the association's territory. No details had been announced at press time.

• **Harold Quinton,** executive vice-president, Southern California Edison Co., has resigned from PCEA's board of directors because of the press of business and the responsibilities connected with his many activities. **R. G. Kenyon,** vice-president, Southern California Edison Co., has been appointed to the board to fill out Quinton's unexpired term.

• **The technical subcommittee** of the highway lighting committee has been invited to participate in the Governor's Safety Council to be held in Sacramento later this year. Chairman G. A. Trosper, PG and E, reports that the committee is now working on the preparation of its presentation for this meeting.

NAED

Pacific Zone National Association of Electrical Distributors holds its fall meeting at Hotel del Coronado Oct. 12-14 with Sam W. Scott, Graybar Electric Co., as its chairman. Secretary R. A. Balzari is in charge of all arrangements. Three general sessions, open to all, are planned with an outstanding program promised.

Rankin Hubbard Miller Dameron Loiseau Cisler

A New Look Taken by RMEL

Like a soldier emerging from his foxhole to see if the firing has really ceased, and a bit skeptical and cautious about it, the utility industry emerged at Rocky Mountain Electrical League's 50th anniversary convention at the Broadmoor, Colorado Springs, to look over the horizon and see what the situation is as of today.

In doing so, it had as top rank an array of executives as had been gathered under one roof for many a day. The program, arranged by Ken Haines, reads like *Who's Who*. And all of them were articulate. They had thoughts to give and they gave them frankly and forcefully.

Celebration of 50 years of an organization served further to contrast the progress and difficulties of the past half century with the promise for the next.

Unable to be there because of illness, H. Hugh Lenhart, Cheyenne Light, Fuel & Power Co., RMEL president, turned over to Past President Harold Rankin and Vice-presipents M. M. Koch, M. G. Brennan, W. L. Breslin the running of the meetings. Greatly missed, the late Gaylord Buck had so well organized the affair that it ran smoothly on momentum under the guidance of Rankin and Ralph Hubbard, RMEL managing director.

If the program had no design in it, it certainly fell into a progressive pattern. As the rich ores of the Rocky Mountain mines are ground and concentrated, the pay metal from the three-day convention output of addresses yielded these concentrates.

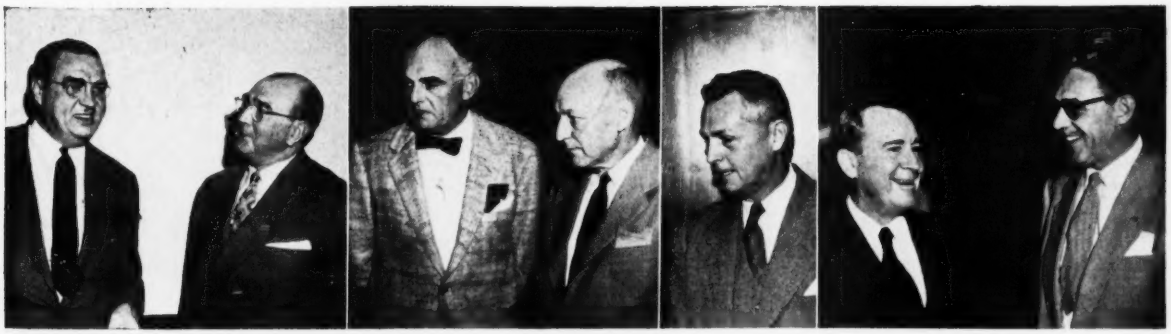
New Power Policy—Or Is It?

Three views of the new federal power policy were voiced; one by John Loiseau, president, Public Service Co. of Colorado, who wondered if the administration really meant it; another by former Wyoming Governor Leslie A. Miller, who said it gave the industry another inning, and not to strike out; and one by Henry B. Sargent, president, Arizona Public Service Co., who told what to do constructively to fulfill the opportunity it implies.

John Loiseau, in analyzing the generalized wording of the policy expressed by Secretary McKay, hoped that more reasonable and honest interpretation of the intent of Congress would be made by the administration, if not a more liberal one. "It contains fundamentals in which we can concur," he said, meaning that local communities take more responsibility, be they private companies, municipals, REAs. The interconnection policy is not clear, he added, assuring that in most cases private lines could deliver power where it was wanted. On specific projects in the area he declared his company has offered to cooperate in both delivery and disposal of power from the Big Thompson, soon to be available. Both PS of Colorado and Southern Colorado Power have proposed to build lines and distribute the output of the Frying-Pan-Arkansas project and save the government four millions for transmission lines. Although a fine job of carrying the private company story to the public has been done in the past six years and some penetration has been made, he urged doubling the effort to inform the public immediately.

Ex-Governor Miller, who was on the Hoover Commission task force, told them they had an opportunity to talk big and back it up with action, a chance they had not had for 20 years. "You can foresee the places where power will be needed—and do something about it. Do the things to support the sentiment of Congress that

Goalby Hyer Terry Chapman Koch Sterne



Flack Boulware McAfee Whitwell Jewell Vennard Leihy

is unsympathetic to these projects. If you don't, you can expect the other sociâlist crowd to come back. They are still around. I think it is dangerous for any man in private business to say it is all right for the government to build as long as it sells the power to him. You have responsibilities: First, to those who have framed this new policy and give you this opportunity. Second, to the private enterprise system of the country, in which you have a bigger stake than anyone else. Third, to the public that uses your power, to enlarge the output and sell at rates that are fair. You'll not only be doing right by your stockholders but will contribute to the rebirth of the private enterprise system."

Henry Sargent faced up to the situation as it is today: the federal government is in the power business; the basic issue in the next election will be between central government and local rights; a balanced budget is the determined goal; new interpretations of congressional acts are being made; studies are being made of economic situations by this administration that open opportunities to present facts; the scope of the Bureau of Reclamation is being defined. To meet the challenge in these new trends Sargent advocated four basic lines of action, which he broke down into detail. First, the industry must have and develop a sound philosophy based on what is best for the public. This must include willingness to finance new projects, advocacy of sound regulation, sound money and taxation, working against discrimination in distribution of power, research to find new sources. Second, it must develop more efficiency in management, in operating practice, employment, a hard-hitting sales program and in raising the money to maintain financial integrity. Third, a real program to inform the public. (He urged those who have policy responsibility to back up the industry's several programs and organizations.) Fourth, he said all must have faith in and be willing to work hard for better government, better citizenship, a better industry.

Money—Where to Get It

Without a federal treasury to dip into, the obtaining of money is a major concern of private industry. Edwin Vennard, president, Middle West Service Co., Chicago, and J. W. McAfee, president, Union Electric Co. of Missouri, St. Louis, covered this from two different aspects.

Edwin Vennard started with "Except as we keep ourselves economically strong we may be considered to have failed" and then, using a model electric company (derived by averaging 300 companies) he briefed an economic analysis of its condition and its needs. His charts showed a decline in per cent of return on investment from 1945-52, even though sales have doubled. Projecting into the next five years he showed that the situation would not improve without a study of and change in rate structure and a strong sales policy tuned to load factor. In fact he advocated that each company appoint a vice-president in charge of load factor. Anything done to improve the rate of hourly use will increase the per cent return. He declared the old sliding scale (downward) to be obsolete now because it is no longer costing less to make more. The cost of serving residential customers, once the backbone of the business, is greater than the return. He suggested that instead of angering large users with a demand rate that they be given discounts for better load factor as an incentive.

J. W. McAfee's plain Missouri talk, about the true nature of the ideological struggle between state and individual and his comments on the early difficulties of getting the individualistically inclined utility executives together on cooperative advertising programs, led into the way this now developed cooperation has worked to undertake projects so big no single company could swing them. He told specifically of how five companies got together to finance and build a huge plant to supply the AEC at Paducah, and how 15 companies joined to supply power at another AEC plant at Portsmouth. Contrary to popular opinion that some projects are too big for private companies, by cooperation any challenge can be met, he maintained, "if we can just keep from diluting the great idea."

More Business in the Future

Many spoke to the theme that the opportunities for greater business in the future were finer than even the tremendous ones in the past half century and told why:

C. W. Schweers, vice-president and director of sales, Allis-Chalmers Mfg. Co., Milwaukee, pointed to the new trend away from socialism to free enterprise as a challenge to prove the latter the better system. As a company serving agriculture and industry, he said, his company noted a narrowing of the gap between urban and rural living, much of it because of electrical living. He deflated the idea that return to peace was to be feared by business and cited population increases, and their effect on the needs of the future as holding out great opportunity. He reviewed the needs to develop more domestic, lighting, factory and agricultural uses of power. He told of the great increases in transportation and highway construction, the need for schools, public facilities, water supply. The chemical industry alone holds tremendous potential market. Because all American prosperity depends on mass production, mass distribution and consumption the challenge of the future is that of salesmanship to keep the flow constant.

Willard Brown, manager, application engineering, Lamp Division, General Electric Co., Cleveland, contrasted the era of the carbon lamp, the tung-

Brown contrasting lamps

Reilly and Sargent in foreground

sten filament lamp and the new electric discharge lamp era, then went on to predict what could be expected in the future, based on research already made. New knowledge of metals to withstand jet engine temperatures can bring lamp filaments with higher efficiencies. Superior fluorescent powders, higher frequency operation, electroluminescence, luminous air even, hold great promise. He then presented a curve that showed the revenue from lighting, projected into the future. Lighting represents 25% of the kwh but a third of the revenue; residential use alone 36% of the load but 44% of the revenue. Yet of recent years only growth because of population has been made. If real promotion is done by the year 2000 sales of energy for lighting can be 800 billion kwh instead of the present rate line index to 300 billion.

George E. Whitwell, vice-president, Philadelphia Electric Co., brought fresh opinions from recent meetings with government and industry economists as to the business situation. Being forewarned of some reduction and readjustment, he said, "we can shape our course to shape the conditions to the benefit of the public, our employees and stockholders." To prepare for a changing America he quoted from a recent *Business Week* special report on trends and commented on what these could mean if understood and the electrical industry made use of them. His interpretation was that a return of specialty selling was strongly needed to maintain the level of business and employment. He paid special tribute to electric leagues, saying that areas that have them are very fortunate. The electric league in Philadelphia, he declared, "is the largest, ablest, and least expensive sales tool that the industry has to sell the products of the manufacturers through the distributors and dealers to be installed by the contractors and served by the utility. Each uses the tools of distribution that he can use best."

James H. Jewell, Westinghouse Electric Corp., vice-president in charge of sales, similarly reviewed past electric and industrial history to project into the future. He discounted any idea of a recession by saying that conditions today are different from those before any previous depression—Americans have an accumulated pool of purchasing power, there are many so-called built-in protections against depression such as unemployment insurance, mortgage insurance, deposit insurance, installment mortgages. Moreover present prosperity does not depend upon continuance of hot or cold war. The economy is strong enough to consume what it produces. There still exists a tremendous backlog of non-defense building. One of the strongest influences for continued growth, he pointed out, is the research that is done by business for new products and materials.

Engineering and Atomic

That neither present engineering potentials nor atomic power have yet neared their horizons was developed by two other speakers, C. W. Leihy, former ELECTRICAL WEST technical editor, now publisher of *Electric Light and Power* and Walker L. Cisler, president, Detroit Edison Co., who has worked with the AEC in atomic power utilization by industry.

C. W. Leihy, recently returned from Europe, told of and illustrated some remarkable engineering developments in Europe from Denmark to Italy. Saying that electric power knows no national boundaries and that engineering is a universal language, he described the integrated power pool among nations, using 380 kv as an international voltage for the network. He showed how some of the solutions have been influenced by their different economies and indicated that they may be answers to needs in this country 25 to 30 years from now. Describing the fuel and hydro situation, he intimated that since the best fuel resources of that continent are behind the iron curtain it might be wise to aid western Europe with atomic power plants and conserve the internal fuel supply for emergency.

Walker Cisler declared that so far atomic industry has been a huge consumer of power. It is hoped that it may be turned into a producer of power with 23 times the energy per pound as that derived from conventional fuels. Development of atomic power he likened now as being at the same relative stage as electric power was when Edison made his first lamps 75 years ago. After showing a G-E movie, *A is for Atom,* he discussed the three phases of atomic development and then the legal phase. The latter, he said, he hoped would be liberalized by Congress to permit faster utilization and thus development of techniques by industry. Present laws limit atomic fuel so strictly that it is delaying development of methods and materials. However progress is being made. The AEC has held hearings to bring forth viewpoints. Several interested industries and the bar association have atomic energy committees

and a forum of them has been formed. He felt that if the electric industry can apply its background of experience and management it can also obtain the large sums of capital needed and can do the job of releasing this new source of energy in ways to benefit the public.

Personal Responsibility

There was no lack of reminding the industry of its responsibilities along with its opportunities, but L. R. Boulware, vice-president, employee and plant community relations, General Electric Co., New York, put it squarely up to every person individually, first to be good citizens, then to learn how to help others to be and actually to teach and show them to be too. "We cannot have freedom and well-being for individuals or groups," he declared frankly and forcefully, "unless a safe majority of working, buying, selling and voting adults know what's the right thing to do and are willing to do and voluntarily to do that right thing." He outlined the balanced self interest of owners, customers, vendors, employees and neighbors, told how economic education could be done with small groups and laid the responsibility squarely upon each one and declared it the duty of each one who is supposed to be a leader.

"We business and professional men have typically had the widest audience, the broadest opportunity and the most facilities of contact and communication—and yet we most of all have tended in the past to be inactive, silent, and sometimes even cowardly, when we should have been facing up to the public correction and the challenging of misinformation."

The convention was closed with laughter as Gene Flack, sales counsel and director of advertising, Sunshine Biscuits Inc., Long Island, N. Y., tossed out story after story, as well as limitless handfuls of cigars, and occasionally a cheerful fact about the health and well-being of the economy. An inspirational talk given by the Rev. W. H. Alexander of Oklahoma City at the Monday evening dinner was another convention special feature.

Just prior to the closing talk the annual election unanimously named these men as officers of RMEL for the coming year: President, M. M. Koch, vice-president in charge of electric operations, Public Service Co. of Colorado; vice-president for Colorado, David B. Hyer Jr., Southern Colorado Power Co., Pueblo; vice-president for Wyoming, James A. Chapman, Rawlins Electric Co.; vice-president for other than utilities, L. A. Goalby, Westinghouse Electric Corp.; secretary, Warren Terry, Home Light & Power Co., Greeley; treasurer, C. S. Sterne, and assistant treasurer, Harry Adler, both of Arvada Electric Co.

Estes Park was selected as the place for next year's convention at a vote during the business session. Dates will be Sept. 12-15, 1954, at the newly renovated Stanley Hotel.

NISA

Northern California Chapter, National Industrial Service Assn., moved out of the Bay region for its Oct. 9 meeting, to be held at Capitol Motor Inn at Sacramento. An invitation has gone out to all motor shops in the area to attend. Jerry Johnson, district manager, Sterling Electric Motors, explained the new NEMA frame sizes and the reasons for them at the last meeting in Oakland. Keith M. Noble was named chairman of the executive committee; Lloyd Flatland, membership and finance; and Ken P. Moile, program and entertainment. T. L. Rosenberg, former director for the region on the NISA board, was scheduled to make a short talk at the Oct. 9 meeting. Keith M. Noble is president of the chapter.

P & K Club

Philip M. Smith, factory representative, was named president of Associated Pot & Kettle Clubs of America at its annual convention in June in Santa Barbara. Smith is a member of the Seattle club, which will be host next year to the national convention. It will be held at Harrison Hot Springs. Robert Walters, Frederick & Nelson, is president of the Seattle club. Other P & K national officers are David Barteleme, San Francisco, vice-president; E. W. Pewters, Seattle, secretary; and W. E. Suva, Seattle, treasurer. Other P & K officers recently elected included Harold Levine, Century Distributing Co., new president of the Denver club, succeeding W. G. Kline. Henry W. Eskuche, Western Supply Co., heads the Salt Lake City club.

NARDA

Regional chairman and vice-chairmen of the National Appliance & Radio-TV Dealers Assn. appointed by Wallace Johnston, president, include these Westerners: California, Carl Hagstrom, San Francisco; John Hodgkins, Paradise; Fred Rock, Oakland; Irving Hassel, Los Angeles; H. A. Witham, Bakersfield. Colorado, Louis Mathis, Pueblo; M. B. Jordan, Colorado Springs. Utah, A. W. Gilner, Salt Lake City. New Mexico, William Diefendorf, Albuquerque; Phil Hale, Artesia. Arizona, Bruce Hannah, Tucson. Montana, C. C. Musburger, Billings; J. D. Ellen, Missoula. Wyoming, A. W. Jensen, Cheyenne. Washington, Tom Carmichael, Seattle; Paul Ward, Tacoma; Mike Wood, Auburn; W. J. O'Rourke Jr., Walla Walla. Oregon, Deo Palmer, Portland; L. A. Hillis, Bend; Douglas Yeater, Salem; A. C. Stockstad, Springfield.

Northwest Appliance & TV Assn.'s profit clinic was held Sept. 28 in Seattle with a slate of NARDA officers and prominent dealers on the program. Full report will be given in the next issue.

Leagues

Intermountain Electrical Assn. has set Feb. 5-6, 1054 as the dates for its next annual conference. A. M. Stephens, president of the Utah County Chapter, is general chairman. The meeting will be held in Provo for the first time. The IEA had a home lighting and an adequate wiring booth at the Utah State Fair and only recently held its annual picnic. Monthly meetings are held among the various chapters through eastern Idaho and Utah.

C. N. Coppin, owner of the Lam-Co Electric Co. in Sacramento, Calif., is the new president of the **Sacramento Valley Electric** League, succeeding A. W. Williford, owner of Williford's Kitchen Shop. Robert Olson of Sears-Roebuck & Co. was elected vice-president. New members of the board of directors are Keith Kirstein of the Radio-Tel Service Co., E. M. Kemp of the E. M. Kemp Co. and Jay Kaspari of the Emigh Hardware Store.

AIEE

R. C. Setterstrom, industrial engineer, Montana Power Co., is the new chairman of the **Montana Section,** American Institute of Electrical Engineers, succeeding Curtis Brown, Bureau of Reclamation, Billings. Robert Labrie, Montana Power, Butte, is secretary-treasurer. Setterstrom, past president of the Montana Society of Engineers, is also first vice-president of Northwest Electric Light & Power Assn.

IAEI

Puget Sound Chapter, at its last meeting in Bellingham, Aug. 29, under Chairman Megler Girard, elected E. D. Dvorak to serve the unexpired term on the executive committee created by the retirement of G. M. Parks. Ray Nelson, Superior Safety Systems, described a newly developed residential fire alarm system for residential use. Norman Bost, National Electric Prod-

ucts Corp., presented the film *Octopus in the Home.* Gene Laster, Seattle City Light, described a new program for adequate wiring promotion certification by the Electric Club of Washington. After some code discussion with a panel consisting of C. M. Kirsop, W. L. Gaffney, J. H. Watt and Ed Dvorak, attention was called to an interpretation sanctioning six subdivisions of a 4,160-v service. The desirability of this practice was questioned and the inspectors, as a whole, were opposed to such permission. Next meeting is scheduled for Seattle Dec. 5.

Arizona Chapter elected Virgil L. Mulkey as its chairman to succeed M. V. Williams. C. B. Parker and H. A. Pacheco are vice-chairmen and Mrs. Dorothy M. Cox, secretary-treasurer. The executive committee consists of M. V. Williams, Bill Harm, Harry Bigglestone, Glenn C. Lawton, F. L. Preizner, Frank Simonson and Frank C. Jones. Another meeting of the chapter, after vacation time, was held Sept. 19 at Prescott.

IES

It was officer-changing time in the IES sections and chapters throughout the West in September.

British Columbia Section opened Sept. 17 with a talk, "An Architect Looks at Lighting," by Harold N. Semmens as R. W. Racine, B. C. Electric, took over the chairmanship from P. A. Donnelly, Northern Electric Co. Ltd.

Puget Sound's new chairman is Raymond E. Adam, succeeding C. A. Scheyer.

Oregon Section began its season Sept. 9 when Frank M. Reis, Pacific Power & Light, took over the chairmanship from Ray W. Preston. Speaker was A. R. Barnes, G-E Supply Co., who gave a report on ballast types and uses.

Northern California Section met Sept. 10 to hear the PCEA talk, "Lighting Doesn't Cost, It Pays," by Charles Long of Westinghouse Electric Corp., Lamp Division, as F. M. Falge, General Electric Lamp Division, Oakland, was inaugurated as chairman, succeeding Robert Thunen, Sylvania Electric Products, Emeryville.

Southern California Section heard Fred E. Cooper, Westinghouse, discuss "Lighting the Alaskan Highway" on Sept. 2 as Don W. Prideaux, General Electric Lamp Division, Los Angeles, succeeded Roy E. Dahlin, Southern California Edison Co., as chairman. Installation was made by Regional Vice-President Leonard A. Hobbs.

San Diego Chapter received its charter at a special ceremony, Charter Night, Oct. 1 in San Diego. The charter was presented by Leonard Hobbs,

Bob Thunen turns IES over to Frank Falge

regional vice-president, who also presented a gavel from the most recent previous chapter in Alabama. C. M. Thompson, San Diego Gas & Electric Co., was installed as chairman; J. Walter Howard, G-E Lamp Division, vice-chairman; C. J. Bunce, Bureau of Home Appliances, secretary-treasurer. At two precharter meetings Frank Van Gilluwe, Holophane Co., spoke on "History of Light and Its Modern Control" in August, and Edward Balogh and Robert E. Jones of Sunbeam Lighting Co. the Sept 3 meeting on "The Case of the Missing Foot-Candle" and "Photometric Testing of Lighting Fixtures."

Southern Colorado Chapter elected its officers at the last meeting before vacation, and Miss Kay Leighton, home lighting specialist, G-E Lamp Division, was the principal speaker. Carl Balsick succeeded Charles D. Bell as chairman, James E. Parker became secretary-treasurer. Meetings are to resume in October.

Rocky Mountain Section begins the year with A. F. Weers, electrical engineer, as chairman succeeding Ferman Bischofberger, Public Service Co. of Colorado.

Arizona Chapter began its meetings Sept. 16. Phoenix members saw a sound film *Picture Journey Through General Electric Lighting Institute* narrated by Arthur Godfrey.

EMEA

Electrical Maintenance Engineers of the **Columbia Basin** is making arrangements to incorporate, according to J. L. Kearns, secretary-treasurer. After an annual picnic at Battleground, Wash., the September season opened with a meeting Sept. 24 in PGE Co.'s Hawthorne Bldg., Portland.

EMEA of Southern California has about 65% of the space signed up for its electrical industry show, April 1-3, 1954, at the Shrine Exposition Hall, according to Chairman Jack Singleton. He and Richard Rogers "cased" the Wescon Electronic Show in San Francisco and signed several exhibitors. The big show will start with an exhibitors' luncheon at the Statler Hotel. There will be special exhibits by schools, universities and government agencies and engineering societies on the balcony of the auditorium. Young Engineers' Day is a feature contemplated. Admission will be charged this year for the first time but exhibitors will be given tickets for distribution to their prospects.

"Industrial Power from Atomic Energy" was the subject of William E. Abbott, senior engineer, reactor engineering analysis of the atomic energy research department of North American Aviation Inc., at the Sept. 16 meeting. The previous meeting in August was a tour of the Long Beach naval shipyards, in which 188 members and guests participated.

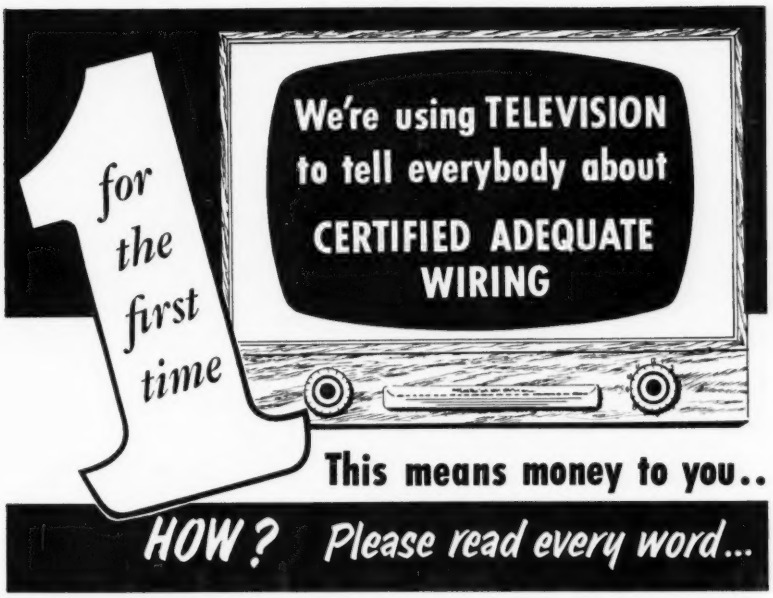
Electric Clubs

San Francisco Electric Club opened its fall season under President Frank Bodine of Westinghouse. The occasion by tradition is the Old-timers Day, at which those members of the industry who have been in it 50 years are especially honored. So honored were William Baker, Al Copley, Frank Boyd, Garnett Young, Charlie Huyck, S. J. Lisberger, Gordon Osborne and Charlie Holtsmuller. The coronation ceremony was put on by W. A. Cyr, William Hynes and Leo Kerkhof.

Electric Club of Los Angeles started its fall season under its new president, R. G. Kenyon, Southern California Edison Co., with a homecoming day Sept. 21. Committee appointments made by the president included K. K. Allen, chairman, attendance committee; E. R. Peterson, auditing and finance committee; William Kyte, civic and interclub relations committee; Jack W. Savage, Christmas party committee; C. E. Crane, fellowship committee; W. J. Wheeler, ladies' days activities; E. W. Morris, membership; Carl Kist, March of Electrical Time; F. L. Hockensmith, old-timers; R. E. Johnson, program; Tom Sullivan, publicity; Carl Heinze, public policy; Al Tracy, sports; W. H. Tynan, stag party; Ted Kennedy, visiting and welfare.

East Bay Electric Club in Oakland started its new year Sept. 21 under its new president, T. O. Gerlishe, with a talk on safety by Clinton Dreyer. It inaugurated a new idea, that of having a products display by one of its members on a display table near the entrance. R. W. Griffin is in charge of a committee for such products displays.

Electric Club of San Diego saw a colored movie, *"A" is for Atom,* presented by Mr. R. Marston of General Electric Co. at its August meeting.


for the first time
We're using TELEVISION to tell everybody about CERTIFIED ADEQUATE WIRING
This means money to you..
HOW? Please read every word...

Brochure to the industry to enlist support for TV spot program designed to reach inside homes in San Francisco Bay area and make people ask themselves the pertinent question

Is This House Dated?

How to open the door to all the houses in an area and make people conscious that they need more wiring? This problem has been tackled from every angle that could be thought of. Yet none succeeded in penetrating very deeply. People just aren't aware that they need wiring.

Television has shown itself able to get inside more houses and reach more people than almost any medium. But it is very expensive. Also very tricky. How then put it to work on wiring?

With volume of new construction falling off rather drastically, particularly in residential, and with a high wage rate to sell, the San Francisco Electrical Contractors Assn. urged the Northern California Electrical Bureau, of which it has long been a member, to do something to promote the wiring business. It even offered to put up money for its share and to enlist funds from the local No. 6 IBEW union to help. Television was thought to be the new device that would get the idea inside the door where all other methods had not been able to penetrate before.

This started what has become a surprisingly energetic program, with support from many who never before saw anything in advertising. Costly as TV is, the project is well under way to launch a test beginning Oct. 26 over one station in San Francisco. This test will be of 13 one-minute spots, one each week on Monday night at 7:30 on station KGO-TV.

Aim of these spots is to put a single question in each viewer's mind, "Is your house dated—electrically?" Is it really modern or still in the 1920s as far as ability to use electricity abundantly for today's needs is concerned?

One-minute spots can say only a maximum of 100 words. There must be visualization of what is meant. So it must hit home quickly and directly. One single idea at a time.

"There has never been a program in this bureau," says LeRoy Bennett, manager, "that has had the time and attention of actual contractors that this has. Why, these committeemen meet nights to discuss ideas and to make suggestions as to what to say and do. They submitted written and even illustrated ideas. Numbers of them." These were turned over to a script committee headed by W. J. Varley, manager of the San Francisco contractors, who heads the bureau committee. On the script committee are Roy Moser, contractor; Ray Weisbrod and Carl Brune, PG and E; LeRoy Bennett, bureau manager, and W. A. Cyr, ELECTRICAL WEST.

This committee has been working with a TV film strip producer. The first four of the 13 series is ready. Others are proceeding.

The film will then be available for repeated use, either on this station or on others as opportunity offers. Repetition of an advertisement is known to bring results. Repetition will cost only station time, once the film is made.

The original program is to cost about $12,000. Included in that is the cost of printing a brochure, illustrated here, to bring in the membership and financial support of all those in the electrical industry who can benefit from increased wiring. Also included is a consumer piece to send to inquirers who write in from the TV questions. And a new handbook of revised standards for certified adequate wiring is included.

These revisions were brought up to date with the needs for today's new appliances, such as dryer, dishwasher, freezer, disposal and room air conditioner, all of which need more circuits. A committee of contractors, led by Ernest Kramm, manager, Northern California Chapter, NECA, and with members from both sides of the Bay —Oakland and Contra Costa County and San Francisco—worked over 100 hours on these standards. That gives some indication of the interest this program has evoked.

No miracles are expected from just 13 one-minute spots. But since the approach is different and the text so simple it is felt that repetition will cause householders to question for the first time the adequacy of the wiring in their own homes. If they do that, the contractors feel they will begin to ask for action to bring their electrical systems up to modern standards, that is up to *date*.

The script of each one asks the pertinent question: "Is *your* house dated —electrically?" Then each tells a different idea. "How can you tell? One way is to look where the power comes to the house. Are there *three big wires* there or just two little ones?"

The "three big wires" will be stressed often. Other simple ways to tell will follow. The "heart of the home" or the circuit panel will be handled next. Whether the house has "working circuits" as well as lighting circuits will be asked. Can one plug in anywhere? Others will deal with the need for skilled electricians from qualified contractors. Haywiring attempts to get some adequacy will be shown up.

Each spot ends with the admonition "Before you buy, build or remodel, be sure to think of the wiring. Is it dated —for 1920 or for today? Is *your* home or your office, your store or plant dated?"

Questions, say all sales training advisors, are the best means to make a need felt. To put a question in the mind of the prospect brings dissatisfaction with outdated things or ways.

With the question "Is your house dated?" the contractors, union, suppliers, utility and even the dealer members of the Northern California Electrical Bureau hope to make the public conscious of its wiring needs. They hope thus to generate the desire to do something about it. They hope to get people who look at houses with an eye to buying to ask the builders and real estate people, "Is this house dated? Are there three big wires? Let me look at the heart of the home and count the circuits. Are there working circuits in here as well as lighting circuits?" Once they do that, it is felt, builders will begin to question too and will see that their houses answer these public demands.

Round Table Institute at Seattle

Everything from blueprint to electric bill connected with electrical living was covered in a two-day Institute on Electrical Living co-sponsored by the Seattle Electrical Women's Round Table and the University of Washington at the latter's Student Union Bldg., recently. It was attended by salespeople and home economists from the appliance industry, as well as schools and others interested in learning more of the interrelation of appliances, wiring, service and rates. The University of Washington's departments of architecture, home economics and the office of short courses and conferences were participants as well as representatives from the electrical industry in various branches.

The program indicates the scope of the institute. Mrs. Edith Rauch, home service director, Puget Sound Power & Light Co., opened the sessions on behalf of the Electrical Women's Round Table. Robert Skeer, district manager, major appliance department, General Electric Co., spoke on "Electrical Living Design—The Manufacturer's Viewpoint." Beverly Travis, consulting engineer, on "Lighting in Home Design." Gene Laster, supervisor, adequate wiring division, Seattle City Light, on "Adequate Wiring." L. N. Roberson, engineer and electric heating consultant, on "Heating Homes With Electricity."

"Basic Kitchen Planning" was covered by Helen Noyes, extension home management specialist at the State College, Pullman, Wash. "Electricity and the Rural Home" was the subject of T. Karl Dimmitt, farm electrification director, PSP&L. Fred E. Cooper told of "Small Appliances in Their Place." He is lighting engineer, Westinghouse Electric Corp. Joe DeLeon, superintendent of public relations, Seattle City Light, told the "Advantages of an All-Electric Rate."

That the "Consumer Cuts the Pattern in Equipment Design" was the topic of Lura Jim Alkire, manager, consumers institute, General Electric Co., Louisville, and Dorothy Sherrill, home economist, Graybar Electric Co., Seattle, talked of the "Electric Range." "The Refrigerator and the Home Freezer" was the topic of Margurette De Tillian, home economist and equipment specialist, Seattle. Mrs. Velma Seat, home economist, Sunset Electric Co., Seattle, described "Laundry Equipment in the Home" and Fran Scarbi, commercial consultant, Seattle City Light, spoke on "All-Electric Hot Water." "Dishwashers and Food Waste Disposers" was the topic of Mrs. Alyce Hazeltine, home economist, G-E Supply, Seattle. Helen Steiner, King County extension agent, Seattle, spoke of "Training American Youth in Electric Living" and Lee Cannon, construction consultant, Seattle Builders & Contractors Assn., concluded the program with "Blueprint for Builders, the All-Electric Home."

A registration fee of $5 for the two days or $3 for a single day was charged to defray expenses.

At the recent election of officers of the Seattle Electrical Women's Round Table Dorothy Wilson, Westinghouse Electric Supply Co., Seattle, was elected president to succeed Alyce Hazeltine of G-E Supply Co. Maureen Kelly, "Prudence Penny" of Seattle *Post Intelligencer,* was elected vice-president. Helen Steiner, King County extension bureau, was elected treasurer and Innis Crippen, Tacoma City Light, secretary.

Jubilee's a Comin'

Just a year from now the electrical industry throughout the United States will celebrate "Light's Diamond Jubilee," the 75th anniversary of the invention of the first practical incandescent lamp by Thomas A. Edison. With it will be celebrated the growth of the electric industry that was developed out of the system for generation and distribution of electricity, which Thomas Edison produced collaterally.

A national committee for the jubilee has been set up by the Edison Electric Institute. On the top committee are: George H. Blake, president, Public Service Electric & Gas Co., Newark; Ralph J. Cordiner, president, General Electric Co.; B. L. England, past president of Edison Electric Institute; P. H. Powers, president, West Penn Power Co., Pittsburgh; Gwilyn A. Price, president of Westinghouse Electric Corp.; and Justin R. Whiting, president, Association of Edison Illuminating Companies.

Preliminary thought is being given to organizing celebration in the West along lines similar to the Golden Jubilee, 25 years ago.

Freeze Three Ways

You've heard of the three-ring circus. In Hawaii they had a three-theater food-freezer school simultaneously. Six home economists worked in pairs in the Palama, Varsity and Kailua theaters on two days in July, showing homemakers who flocked to the theaters all the things that could be done with home food freezers. The theater doors opened at 8:30 and sessions started at 9:30, ran to 11:30 a.m. Crowds of women and their children packed the three theaters during the event.

Irma Meeks Boyen, Hawaiian Electric Co., and Gladys Shiroma, an assistant, put on the Palama show; Hortense Clifford and Mew Lun Hee the Varsity performance, while Helen Winslow and Nancy Roberts held forth at the Kailua. The Honolulu *Star-Bulletin* sponsored the triple school and carried a 14-page special section in two colors and in one case four colors. The entire affair was a project of the PCEA electrical living committee. The special gimmick offered was a $30 to $50 gift of food to go with the freezers sold during the campaign by all the cooperating dealers and distributors.

In addition to the special section the Honolulu *Star-Bulletin* also published a tabloid section of 12 pages without advertising, calling it *Freezer Facts,* filled with copy on the ideas, tips, menu plans, recipes and suggestions for freezer use. This was announced as published by the electrical living committee of the Pacific Coast Electrical Assn. (Hawaii).

A souvenir program given to all who atended contained recipes, space for notes, many suggestions for uses and possibilities with the freezer, and a listing of the 29 firms cooperating in the big freezer school. Results in sales had not yet been obtained but the program put a great impetus on the sales of appliances and in particular freezers and refrigerators during the summer months.

ELECTRICAL WEST *Sales Guide*

News Letter

October 1953

©

FOR THE ELECTRICAL MERCHANT OF THE WEST

"A cut price never expanded a market. It only makes a sale by Bill Jones instead of Sam Brown to a customer who has already made up his mind to buy," said George Whitwell, vice-president of Philadelphia Electric, at the RMEL convention at Colorado Springs. — Well said

The appliance business evidently has been fair to middling, judged by the absence of moans and complaints during the past month throughout the West. It was still sharp business and there were lots of gimmicks. Among these, a Salt Lake City dealer offered a clothes dryer (110-v, discontinued model) free with a living room set of furniture. Another tied in with a newspaper campaign against the garbage situation by offering a disposer at no down payment. Premiums were advocated by Admiral's Seymour Mintz as a sure-fire way to sell against discount houses and the company offered an electric blanket free with a refrigerator on a combination deal. A Colorado Springs dealer found a dryer and ironer combination could be sold as a package but it took home calls and demonstrations to do it. — Induced

San Francisco's Home Show was pretty much of a flop, both as to exhibitors and revenue. It was sponsored by the Associated Home Builders but was not supported by the industry. And Los Angeles did not open its "First Annual National Electronic Show," scheduled at Santa Monica Pier Oct. 2 through 11. It was aimed strictly at the public and not the trade. — Overdone?

Emerson Radio & Phonograph Corp. acquired a majority interest in Quiet Heet Mfg. Corp. Immediately it was sued by Emerson Electric Mfg. Co. of St. Louis to prevent its use of the name Emerson on refrigerating air conditioners, which the latter manufactures. Emerson Radio announced it would show its "Emerson Air Conditioners" to the trade early in December. — Not related

Discarded ice boxes and refrigerators, in which a number of small children have suffocated in the past few months, worry the household refrigerator and farm and home freezer sections of NEMA and a national advertising campaign will be conducted to scrap such devices or to remove the doors and lids. It urges all dealers to publicize the idea in their own home towns to end the possibility of these tragedies. — Death traps

Hi-fi is the latest brush fire sweeping the radio-TV industry. Practically all are getting into the act. Magnavox warns the industry against misuse of the term lest it bounce in customer dissatisfaction. — Better be sound

Color pot boiling

Color TV just won't stay shushed. As various spokesmen tossed discouraging blocks of high cost and two-years-to-wait and National Television Systems Committee was preparing to give FCC demonstrations of it Oct. 15, Emerson's President Abrams showed a model of the first commercial compatible set for home use and mass production to the New York Security Analysts. RCA, whose system is being shown, was expected to have the first sets ready. General Electric Co. showed its tri-color cathode ray tube to the National Electronics Conference in Chicago and said it was ready for production now. G-E's Dr. Baker predicted a big jump in tube sizes to around 21 in. as soon as mass assembly is achieved. Meanwhile the Lawrence color vision tube made in Oakland has an 18-in. screen as compared to the 14-in. for the other tubes. Also said to give a brighter picture. A new plant to manufacture the tube is standing by, ready to get into volume production when FCC gives the go signal. Columbia-CBS said it could get into mass production with a color tube system of its own, also.

This TV picture

Other TV flashes include: Climax molybdenum mine in the high Rockies near Denver has piped in co-ax cable from antennas at 13,770 ft to pick up Denver stations and keep the miners home and happy. . . Salt Lake's KSL-TV, which lost its high tower on a mountain peak last December, will rebuild it as well as add power to its transmitting equipment. . . In Great Falls KFBB-TV expects to get a test pattern on the air in mid-November. . . KRDO-TV in Colorado Springs, an NBC affiliate, started Sept. 27, putting new life in TV sales. . . The race is on between two TV stations, one in Idaho Falls, the other in Pocatello, as to which can get on the air first. . . Wave traps are being used to clear the channels for set owners in Santa Barbara, where its new station on channel 3 interferes with Los Angeles channels 2 and 4--a situation that may come up in many other areas.

TV in news

Pacific-Mercury TV Mfg. Co., despite loss of 4,000 receivers in its big warehouse fire Sept. 9, has been able to continue shipments. . . Admiral Corp. broke ground for a TV and appliance center in the central manufacturing district of Los Angeles. . . RETMA opened an office in Los Angeles with Joseph J. Peterson, electronics engineer and former editor for Caldwell-Clements Inc., as head.

Accessories

Among gadgets and adapters is an Imperial UHF converter announced by Walsco Electronics Corp. of Los Angeles. . . Blonder-Tongue Laboratories has what it calls "Ultraverter," an all-channel UHF converter. . . Semco Engineering & Mfg. Co., Los Angeles, makes a remote control kit for adapting any TV set. . . And to permit viewing without disturbing others, Kentrol Corp. of Philadelphia makes a unit for $14.95 that can be attached to a set to cut the sound from the speaker into an ear phone. . . Emerson with a very small pocket radio predicts that portables no larger than a pack of cigarettes or Dick Tracy's wrist radio will soon be an actuality. . . Portable TV is a year off, says Raytheon.

Prices up or down

Price reductions were announced by Raytheon on 12 basic VHF models along with a shortening of the line. . . Portable Electric Tools Inc. also announced price reductions up to 16% on 10 basic home workshop tools. . . On the other hand, Whirlpool advanced the retail price of its 24-in. de luxe automatic washer $10 to $269.95 and $20 more with the "suds miser."

Where to tax

NEMA, GAMA and the Oil-Heat Institute of America joined forces to urge removal of federal excise taxes on electric, gas and oil appliances. However, President Eisenhower in declaring against a universal sales tax said an excise tax on all manufactured products might be needed.

Square dancing is popular in the Rockies but the greatest changing of partners and grand rights and lefts lately have been in the distributing business. Noted recently were: Hendrie & Bolthoff Co. no longer handles RCA but has the Columbia-CBS line. Graybar lost the Crosley line to Larson Distributing Co., which had Bendix. Emerson Radio is now distributed by Public Distributing Co. at 1520 Wazee. Melvin M. Zelinger is owner. Dahl-Conger Inc., whose principals were formerly with Larson Distributing, succeeded Austin & Sons, taking the building and stock, and now handle the Servel and Capehart, having dropped Arvin. Savage Distributing Co., which had Emerson, now has Hoffman TV. Ward Terry & Co. at 70 Rio Grande Blvd. lost Hoffman to Savage and took on RCA-Victor. Kitchen Distributors Inc., 2430 E. 6th Ave., with Ashley Buck, former Public Service of Colorado, as treasurer and sales manager and P. G. Hartman as president, now handle Thermador, Hobart dishwashers, Waste King, Geneva kitchens, L&H ranges and Thor washers in complete kitchen package sales.

Also do-se-do

Elsewhere these distribution changes: Kaye-Halbert has lined up with Allied Stores as distributors beginning with C. C. Anderson Co. in Ogden, Logan, Boise and Seattle. . . Morrison Supply Co. Inc. now distributes Youngstown kitchens in San Diego. . . Deepfreeze has appointed Sunland Supply Co. of El Paso as distributor in 19 counties and in New Mexico. . . Love Electric Co. of Seattle, Spokane and Portland has been made CBS-Columbia TV distributor in the Northwest. . . Olympic of Southern California Inc. has been formed to distribute Olympic TV. Is located at 6101 S. Central Ave., Los Angeles. Was formerly handled by Radio Products Sales Inc. . . Horn & Cox Inc. gave up distribution of Pacific-Mercury TV and Pacific-Mercury Television Sales Corp. was set up to replace them. Great Falls Paper Co. has been appointed for Montana. Robert Malcolm, former Admiral distributor is sales manager in Denver, with a factory branch. . . Apex laundry equipment is represented in San Diego and Imperial Counties by Thomas Distributing Co. . . DuMont Television placed Bill Brittle in charge of San Diego County representation for Quality Distributors Inc. . . G. E. Supply has established a Stockton branch. Graybar has opened new branches in San Bernardino, Long Beach and Santa Ana. . . Leo J. Meyberg Co. is distributor for Crescent Phonograph and tape recorder lines. . . Sues, Young & Brown has been named the distributor for McGraw Electric lines, including Toastmaster, Tropic-Aire, Ever-Hot and Manning Bowman.

All over the West

Cory is about to bring forth a Cadillac of coffee makers with gold-plated base to sell at $50. It will be introduced first in New York and in West Coast areas. . . The rumor last month has been verified. Norris-Thermador Inc. has purchased A. J. Lindemann & Hoverson Co. for $1,800,000. E. A. Lindemann, son of the founder of L&H, remains as president and general manager. . . The West's big manufacturer of disposers, Given Mfg. Co., announces a new Waste King pulverator with greater sound-absorbing "hush-cushions."

Manufacturer flashes

Among people these changes took place: In Westinghouse Electric Supply George W. Oliver was appointed consumer products sales promotion manager for the southern California district. He was formerly with Leo J. Meyberg. Roy D. Constable, former branch manager of consumer products, Portland, was named north Pacific district manager in Seattle and Frank M. Dunn, district sales promotion manager, succeeds Constable at Portland. Jack Hangauer, appliance salesman, was made new district sales promotion manager. Robert M. Nichols Jr. was made Sacramento area consumer products manager. William P. Frost was moved from Wesco at Vernon to be south Pacific district manager of Westinghouse-TV-radio, succeeding O. F. Achtenhagen.

More moves

L. E. Marsh has been sent West by Carrier Corp. as merchandise manager on room units and ice machines. He headquarters at 251 First St., San Francisco. . . Lou Stull came back home to Oakland and is now with General Appliances. . . R. B. McKnight is now Western district sales manager for Nesco with office in the Merritt Bldg., Los Angeles. . . Edwin P. Cook of Denver is a new representative for Toastmaster water heaters of the Clark Division, McGraw Electric Co. . . Pete Plakos was named sales manager of Tubbs Electric Co., Spokane. He was formerly with Meyberg, San Francisco. . . J. A. Keim of Capistrano Beach, Calif., formerly with Royal Vacuum Cleaner, has been made district sales manager for Apex vacuum cleaner division in the 11 Western states. . . E. F. Davis, formerly Kaemper & Barrett Co., is now sales manager of Pacific Telecoin Corp., San Francisco and Los Angeles. . . Deepfreeze promoted R. F. Harnish of San Francisco to new regional sales manager for the Western states. . . Easy appointed Robert S. Grimm as district sales manager in Oakland, replacing Barney Morris who has transferred to San Francisco as district sales manager. Grimm was with Thompson-Holmes. . . At the national level, big news was that H. L. "Red" Clary, v-p in charge of sales for Norge, resigned to join the Bryant Heater division of Affiliated Gas Equipment Corp.

Still more

Ten per cent of the twins born Sept. 23 for the Westinghouse "Blessed-Event" day came from California. Of 233 twin births, 23 were Californians. This was less than the 303 sets of twins with 41 from California in 1952. Washington had 8; Arizona, Colorado and New Mexico each 3; Idaho 2; Oregon, Utah and Wyoming 1; Montana and Nevada none. Each received a set of Westinghouse twins--the Laundromat and clothes dryer--and a year's supply of baby food.

Fewer twins

Back to real selling, up Spokane way, as Washington Water Power announced a new "through the dealer" area-wide sales program in cooperation with the Inland Empire Electrical League. The program is initiated by the reorganized general sales promotion and information department under Kimball Jack, who calls it "The Leadership Campaign." It is aimed at the 15,000 present nonusers in the range and water heater category and the 50-man sales force of the company will contact low-use customers and bring the sale right to the dealer to sign up. Included is a program to convert all two-wire to three-wire services and a full industry tie-in with cooking schools, range shows, advertising and mass selling techniques. Quota is 1,000 ranges and 600 water heaters in the first three months. See story next month.

Back--with a difference

"Light Comfort" has just been produced by the lighting division of the Electric League of Los Angeles and 8,000 copies will be distributed free to utilities, manufacturers, distributors and dealers to pass on to the public. Twelve local manufacturers and distributors of lighting fixtures bore the cost and Bud Blitzer of Light Trend, Nat Bloomberg of Lightolier, Joe Grossman of Dornor & Co. and H. H. Allison of Sylvania produced it. . . The league also ended a series of meetings with Pacific Telephone Co. to simplify classifications in its yellow directory to fewer headings. For instance, washers, ironers and dryers will be carried under one heading in the "W" section with cross references.

Light up the home

Ray Jones of Ray Jones Washing Machine Parts Co., Denver, chairman of the manufacturers relations committee of the Appliance Parts Jobbers Assn., was asked to represent the jobbers at the first parts and service committee national meeting of the American Home Laundry Manufacturers Assn. in Chicago Sept. 25. Jones told the needs for factory supervised and endorsed cooperative service training courses to fit men to install and service appliances of all makes.

Protect the brand name

As More Stations Come on the Air, and That You May Know . . .

As more television stations come on the air throughout the West, many appliance dealers and utility companies may be thinking of how to use this effective medium for advertising. True, the big network shows carry national manufacturer programs, yet it is at the local level that the dealer wants to attract television viewers into his store to sell appliances. The utility may wish to use it to promote the general idea of living electrically.

In three issues, beginning with October, the advice of some home economists of the West who have used this medium successfully will be carried in these columns. The main part of this material will come from a presentation made by Cleo Filsinger, San Francisco Division, Pacific Gas and Electric Co. home economist, before a Pacific Coast Electrical Assn. workshop some time ago. The opportunity to use such information is just now arriving in many communities. Hence, her advice is published that it may aid dealers to get their money's worth from television advertising.

Prior to that series, the comments made by Dorothy Sherrill, home economist for Graybar of Seattle, before the Northwest Electric Light & Power Assn., Business Development Section, makes an excellent preliminary. Miss Sherrill did not have a paper but talked extemporaneously from her own experience. These notes cover the major points that she made in her talk before the association.

How to Use TV

as Dorothy Sherrill sees it

We are not yet grown up in the use of television as a selling medium. Much of what is being done is still experimental but we do know that it is an effective selling tool.

For electrical wares of all kinds, the beauty of television is that these appliances actually can be demonstrated so that the viewer can see them.

Therefore, in planning to use television, look to the viewers and try to find out what they think.

What is it they dislike about television advertising? When you find that out, then search for ways to minimize the irritation. Although few people have anything good to say about commercials, these are the things most people dislike:

Overcrowding—They don't like too many commercials at breaks.

Jarring interruptions—The introduction of something wholly foreign to what they have been seeing.

Noisy commercials—Remember you are talking to someone in his own home and don't have to shout.

Tiring, overworked techniques—It is interesting to note that what is disliked when they are neutral are twice as much disliked when overworked.

What people like about commercials are these:

That they be kept within reason. Six minutes per hour is the very maximum of commercials, especially on evening time.

One or two good commercials are far better than many poor ones.

Check with the production manager to see what comes before and after your commercial or you may lose your audience.

Sincerity in presentation. It promotes confidence.

The importance of rehearsing can't be stressed too much. Rehearse what you are going to do so that you can do it easily and so that you have a good talking knowledge of the wares that you are showing. In this connection, women are more apt to write in the way that women think and perhaps should be the ones to write the commercial or the presentation.

Integrate with the program, but be sure to keep it simple and direct rather than dramatic.

Sugar coat the TV commercial but be sure to give it some zip at the same time.

Make it fast moving. Use 20 seconds instead of minutes. If you have to show two different pieces of action, use two similar pairs of hands to do it in order to save time between.

One of the most important thoughts to get in mind is to get rid of the concept of talking to thousands of people. What you are really talking to is one person at a time. Bring the viewer right into the act with you.

Real-life sequences are much better than artificial or smart-aleck ones.

People like children in the TV sequences.

Don't talk down to people, talk naturally.

Planned demonstrations or commercials are far better than hurried impromptu ones. Often the viewer needs more than he would get from a newspaper or radio announcement, for after all he sees.

Talk to the lens and you will talk directly to the viewer.

Rehearsal time can be obtained and it is a good idea to use it. Choose a good program to go with, if you possibly can. Many of the local shows are good and can be better geared to your own.

You will be astounded sometimes at the way people recognize you from a television appearance. As long as a year afterward, people will stop you on the street and talk to you intimately about your program.

Television is a fine medium, use it in addition to your newspapers and direct mail.

Three Join for Service

To meet the need for qualified television service in a small community, three dealers in Paso Robles have gone together to form the Paso Robles TV & Appliance Service Co. at 709 12th St. Those involved are the Lou Wilcox Co., R. C. Eaton Co. and Hammond's Firestone store.

By combining efforts, good personnel and technical equipment, this service is provided to the public.

Another interesting development in Paso Robles has been the establishment of the wiring part of the business bought by Lou Wilcox a couple of years ago as a separate business. Wilcox bought out the Paso Robles Electric Co. at 823 12th St. and has now renamed it Lou Wilcox General Electric Dealer. He has taken into partnership Guido Dusi, former navy air corpman, who has charge of the wiring end of the business and the Paso Robles Electric is now located at 918 13th St.

Meanwhile, Lou Wilcox is remodeling the store to provide new office space and stretch the store into what used to be the wiring department. His son Tom is associated with him in sales and management.

C. C. Musburger holds a sales meeting every morning at his Appliance Mart in Billings. His successful experience proves that . . .

It's Still the Best Way to Sell

Too bad the morning sales meeting went out with the war, for it is still the best way to train and enthuse salesmen, Cecil C. Musburger, owner of Appliance Mart in Billing, believes. And he practices what he believes. There is a half-hour sales meeting every morning, including Saturday, in his successful appliance store. How and why does he do it? Bend an ear.

"This appliance business is a fast track," says Musburger. "Retail salesmen are the key to sales success. Let's give them help instead of hell. If salesmen aren't successful it's because of a lack of management. You've got to have a sales manager before you can have a salesman. Salesmen have to be taught how to sell. Lately salesmen have been overpaid and undertrained.

"Where do we get salesmen? They are everywhere. Don't go across the street and take one away from a competitor. Find a young man and train him. Selling is a young man's profession.

"But you've got to sell him first that selling is a safe job, a clean job; that it's fascinating and interesting. That's why people stay in the profession for 40 years for the love of it.

"We hold a sales meeting every morning. That's where the training is done. Lots of dealers say they can't hold one *every* morning; what would there be to talk about? But we do and have plenty to talk about. A good, red-hot morning meeting begins at 8:30 sharp, runs to 9, six days a week. Then we back these up with contests. You've got to have them. Sometimes the winner gets a trip or some other prize. A trip seems to spark my boys most. Sometimes it's a steak dinner and beans for the losers. It depends on the promotion but we try to keep something going all the time.

"What do we teach? Just the fundamentals. It's all kept simple. Don't

A salesman rehearses his sales story to the boss who acts like a tough customer

Salesman Chuck Parr demonstrates a cleaner to a clothier prospect and thus makes a sale

Selling is showmanship, Cecil Musburger believes, showing cap advertising his store

teach high falutin' stuff. And we act it out. Selling is showmanship. The customers are buying the act you put on. The appliance can't sell itself. It just sits there. It can't smile back. So we go through our selling act to each other and criticize or make suggestions to each other on how to improve it. One boy may have met up with a special resistance from somebody and can tell the others about it and then we all try to work out the best way to meet it."

He also feels that the wives must be sold. If a salesman's wife is not sold on his job she can do him a lot of damage. So special events are put on for the wives. The Montana Power home economist, for instance, puts on a special home economics party for them and they become boosters for the appliances their men are selling.

Musburger believes in working his salesmen in and out of the store. "Don't keep him inside all day," he says. "He'll go stale on you. Get him out. But don't keep him out all the time either or he'll get discouraged. Selling at night is most valuable. We make 60% of our sales at night to the husband and wife together. If the salesman's wife objects to him being out nights you have to see that he goes home when he ought to. You've got to watch your guys. They've got to have the right mental attitude. That's one of the reasons for morning meetings. If a guy is off the beam you can see it and correct it. Sometimes you have to dress them down."

As for pay, Musburger feels that it is better to give them only a working base rate and a sliding scale of incentive margin on the volume they do. And he never sells against his salesmen; says it isn't right. They can't buck the boss.

Appliance Mart will only handle lines that are exclusive with it for the area. Only on such can they feel that the hard work selling they do has protection and a customer who is sold cannot go down the street and buy it from someone else. Costs of doing business are high and if he is to pay his salesmen and give bonuses Musburger knows he has to get his full margin. In fact he advocates that a dealer set his own, based on what he knows he needs to operate soundly. At present he handles the Monarch line of ranges and has done a big job with it; Magnavox radio and TV, for which he is one of the nation's top volume dealers; Universal cleaners; others.

One of the most successful promotions each year is for Mother's Day. Last year seven high school lads were entered in a selling contest as "salesmen-for-a-day." They were trained to sell housewares by the salesmen in preliminary training sessions. Newspaper ads with the boys' pictures announced the contest and customers voted on which was the best salesman. He won a radio set and all received either prizes or cash and special meals at hotels. Over a thousand dollars worth of housewares were sold the Saturday before Mother's Day by them. Last year the boy who won came back at Christmas and bought his mother a range. Another applied for a job selling. The event was like a fair, the regular salesmen dressed up, demonstrating appliances.

Selling isn't wine, women and song, Musburger says. It's work, but fun. More salesmen fail from drinking coffee, he says, than whiskey.

School lad being trained to sell housewares for a Mother's Day selling contest promotion

At the anniversary dinner: Bureau President R. D. Halvorson; John K. Herbert, NBC; Thomas E. Sharp; Admiral George R. Henderson; H. D. Dillin, San Diego G&E; Tom Bomar, California Club; Sam L. Hall, treasurer; E. W. Meise, SDG&E

Ivan Lauritzen, Video Service; Beecher Dixon, Better Business Bureau; Robert Rechtol, Convair; John Bate, port director; Lee Bornstein, bureau v-p; Raymond A. Rich, Philco; George Stoltenberg, the retiring bureau president; J. Clark Chamberlain

Told Six Steps to TV Sales

The current period of readjustment of the appliance-TV business should be over by 1955 and then the background will have been set for a gradual upturn that will bring annual volume to $7½ billion—nearly double the 1953 level, according to Raymond A. Rich, vice-president of Philco Corp., Philadelphia, in one of the major addresses before the annual fall conference of the Bureau of Home Appliances of San Diego County on Sept. 16.

More than 400 dealers, distributor personnel and utility people attended the banquet and evening sales conference that celebrated the 21st birthday of the bureau.

The other visiting speaker, John K. Herbert, vice-president in charge of sales for NBC, New York, told the group that the West Coast has barely begun to realize its potential in television—either as a place for the origination of programs or as a market for sets. He pointed out that the three million TV sets in the Western states, served by 21 TV stations, represent 12% of the sets in the nation. Soon, he said, there will be 225 stations in the U. S. and 41, or 18%, will be in the West.

The large increase in appliance-TV dollar volume seen for the years following 1955 will be enjoyed individually only by those dealers who plan not only for their current needs but project their plans into the future, said Rich. The appliance-TV dealer will have to increase his volume, he said, and to do that ". . . you must decide on what your goal or your target is, how much manpower you are going to need to meet it, how much capital will be required to sustain it, whether you should move to a new location, enlarge your present store or add new stores, the sales training job needed, the commission or salary allotment for salesmen, and a sound system for keeping tab on your plan."

Successful planning involves attention to six steps, Rich said: (1) Estimating current and future sales on a planned basis and establishing sales targets; (2) evaluating the lines carried and deciding what lines to add and what to drop; (3) adopting methods for increasing sales of appliances to a planned volume; (4) planning what changes are needed in the store, with attention to housekeeping, better lighting, air conditioning, merchandising methods; (5) keeping track of costs and keeping up-to-date records.

Secretary-manager J. Clark Chamberlain moderated a panel of guests who brought expert views of the San Diego County business outlook. To bring to the attention of the dealers the importance of the bulletins and releases of the bureau, the program offered a one-act skit called *Read 'em or Weep*. Starring as the appliance store manager whose business was as bad as his lack of attention to the bulletins and other important mail was Carleton Baker. Helping guide unopened mail to the wastebasket was a secretary, Louise Murray. Arriving to bring the light and guide the dealer into regular readership of the bureau's mail and enthusiastic cooperation with its programs were a manufacturer's agent played by George Hawkins and a newspaper editor-space salesman performed by Frosty Raymond.

The conference opened with the installation of the bureau's officers for 1954. Robert D. Halvorson of La Jolla was installed as president, succeeding George H. Stoltenberg of La Mesa. Lee Bornstein became first vice-president; Ivan Lauritzen, second vice-president; Sam L. Hall, treasurer.

ELECTRICAL WEST Contractors' News Letter

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Financing may ease up for building if the signs mean anything. After a tightening that made buying of a house only for those with a good-sized down payment and gilt-edged credit and which put the new house market in a slump, Business Week reports a change in the money situation and indications that something will be done to loosen credit for building a bit. While contractors with big jobs have been reasonably busy finishing them, the going has been slower for smaller operators dependent upon local house and small commercial construction.

Easier money

As the new higher wage rates went into effect both unions and contractors glanced up from the involved details of working out the machinery to collect, keep and deliver the health and welfare contracted for to look a little concerned as to what they had to sell to the public to support all of it. Sharp bidding, prevalent lately, won't do it, they find. So more attention is given to promotion. The National Electrical Contractors Assn. business promotion program is being worked hard by most chapters. In the San Francisco Bay area the chapters and unions are joining financially in support of a TV ad spot to turn viewers' thoughts toward the inadequate wiring in their homes, offices, stores and plants.

Have to sell it

Wage raises in the Pacific Northwest just negotiated include these: In Portland the Oregon-Columbia NECA and Local 48 agreed to a 10c an hour increase for health and welfare on top of the existing wage rate of $2.85. Concern over whether all will pay is reflected in a proposal to require a $100 deposit from contractors who become delinquent. Also to bring other employers of IBEW men up to a competitive level the union was asked to require a scale of $2.95 from those not parties to the H&W trust agreement . . . In Spokane and Seattle the issues were taken to the Council on Industrial Relations. Spokane's wage was raised to $2.82¼ without H&W. Seattle, where $3 plus 7½c H&W was asked, came out with $2.92½ plus 7½c H&W, effective Sept. 10 . . . The line rate for the Northwest Line Constructors will now be $3, without H&W as yet . . . In Alaska two locals settled for $3.92 and two others at $3.52. More negotiations are pending over a 40-hour week.

Scales rise

Discrimination against nonresident contractors on travel and subsistence, such as found in many union agreements, was protested at the Northwest Conference of NECA Chapters when it met in Portland, Sept. 18, and a resolution was passed by it to take to the NECA convention at Miami Nov. 16-20. Most chapters have been saddled with such clauses in agreements they inherited and will ask through NECA that IBEW move to remove these discriminations.

Soak outsiders

Proposed new dues will probably be the hottest topic at the NECA convention. While several different schemes may be offered to revise the dues more equitably the one officially proposed by a dues study committee would not raise the dues of very small-sized businesses but a few dollars, would raise those of medium-sized businesses considerably, and would relieve the unusually large contractor of what may have been an unfair proportion of support of the entire organization. Some 52% of the income of NECA has been paid by but 8% of the membership and some of these feel that they cannot get more than the same service from NECA that medium-sized operators do. Awhile back some of the big ones threatened to secede and set up another association.

Uneven dues

Electrical Contractors Association of Santa Clara & San Benito Counties moved Oct. 1 to 83 Basset, San Jose, from its previous location at 580 Stockton Ave. where the lease expired. More room and quarters for committee meetings with parking space close by make this a desirable location. H. F. Kelly, representing the Building & Loans Assn., is scheduled to talk on use of FHA Title I loans for electrical modernization at the October meeting.

More room

New lab.

Underwriters' Laboratories Inc. signed a contract to start work on its new West Coast testing station on a seven-acre plot in Santa Clara and hopes to move in by fall of 1954, leaving its present Sansome St., San Francisco, location that has become too small, C. R. Welborn announced.

Three wins

Merrill Humber won the national contest for "My Most Interesting Lighting Job" as he had the Northern California Section and the South Pacific regional contests of the Illuminating Engineering Society. His job was reported in the May issue, page 88. It covered the lighting solution to the new Broadway tunnel in San Francisco.

Caution

Aluminum screw shells on lampholders are not approved for use in wet locations, contractors are reminded. The use of such lampholders on outdoor electric signs is likely to be turned down by inspectors, even if found on UL labeled signs. Even aluminum screw-base lamps are apt to give corrosion trouble where exposed to salt atmosphere.

It's better —electric

An electrostatic flocking process is being introduced by a hosiery manufacturer in Hollywood. Instead of blowing flock through a spray gun by air pressure or vibrating the article on which the flock is dusted, the electrostatic method results in a more substantial finish because every fiber is applied to the surface uniformly and in an erect position. The two plane surfaces are charged, one above the other at variable distances, with opposite polarity. The flocking material is dusted over the surface of the bottom plane while the material to be finished is attached to the upper surface. High-voltage d-c charge ionizes the flock and drives it to the opposite polarity.

Dubious distinction

Misuse of electricity stands second in the list of causes of fires from known causes in the U. S., the National Board of Fire Underwriters has shown in release of new tables compiled from Jan. 1, 1942, to Dec. 31, 1951, inclusive. Matches and smoking are the No. 1 cause with 25% of the claims and 17% of the property loss. Misuse of electricity comes next with 12% of the claims and 11% of losses.

Both

A maintenance-free industrial fan is being introduced by the Murray Co. of Texas Inc. with sealed lifetime lubricated ball bearings in both fan and motor. The company offers a 10-year guarantee on its de luxe models. The new line is in addition to the standard line of industrial fans in all sizes from 24 to 48 in. and ⅓- to ¾-hp motors.

Quicker

A template to simplify layouts of home heating and cooling equipment on architectural plans is offered by General Electric's home heating and cooling department. The outlines are in ¼-in. scale.

For market growth

General Controls Co. is building a new plant for its Appliance Controls Division in Burbank, Calif., near its main plant in Glendale. This will increase its output of automatic controls for domestic, industrial and aircraft applications.

Bidding guide

A new electrical estimating guide, Sherlock's "Blue Book of Electrical Estimating," is being published by Estimating Handbooks Associates at De Kalb, Ill. The book was written by George L. Sherlock, who has been an electrical contractor, maintenance foreman and chief electrical estimator.

Quick on the draw

Packaging has reached the home-tool business as SpeedWay brings out an Executive power kit with a holster to sell to home owners, hobbyists, farmers or for installation men and servicemen. The holster is made of Exylin synthetic material and will carry the drill and accessories, fastened to the trouser belt. Even the electric cord is wound up and held in place by straps on the back of the holster.

Expands East

Prescolite Mfg. Corp. of Berkeley, Calif., has just finished a new plant in Neshaminy, Pa., near Philadelphia, making a second major expansion in less than 18 months. It recently greatly increased its facilities in the Berkeley plant.

Appointments

Walter A. Matzinger has been made Southern California district apparatus and supplies sales manager for Westinghouse Electric Supply Co., William B. Meek, district manager, announced, and Raymond E. Strate was named for the Long Beach branch, where a new office and warehouse is nearing completion at 901 West 12th St. Matzinger has been Los Angeles branch sales manager since 1944 and has had other executive assignments since.

To sell conduit

A new conduit and EMT booklet has been published by the rigid steel conduit and electrical metallic tubing section of National Electrical Manufacturers Assn. It tells from the user's standpoint of the low maintenance expense, dependability of service, continued safety, adaptability to changes in power loads that a conduit system provides. Copies may be had by contractors by writing to NEMA at 155 E. 44th St., New York. Also offered is a manual, in nine chapters, 132 pages, containing data on steel electrical raceways and how to plan, design and install them.

Extends

Triangle Conduit & Cable Co. Inc., maker of electrical wire, cable and conduit, has diversified and will now manufacture brass and copper tube.

Familiar method

Steel supply being good again and a new administration less inclined to punitive interpretation of the laws affecting business may bring a return to conduit pricing at a delivered price instead of fob factory as required under rulings in the past.

Permitted

Type UF underground feeder and branch circuit cable is now recognized by the NECode and approved by Underwriters' Laboratories and so listed. Comes in single- and multiple-conductor designs with materials that are resistant to corrosion, fungus and moisture.

Expands

Graybar has opened new branch houses in Long Beach, San Bernardino and Santa Ana. They are branches of the Los Angeles house of which Sam Scott is manager.

School session

Sylvania staged a school lighting symposium in Fresno Sept. 24, inviting school officials from the San Joaquin Valley to hear discussions of lighting techniques and solutions from Robert W. Thunen, lighting engineer, Sylvania; Larry Barre, PG and E; and Marlo Denning, Incandescent Supply Co., Fresno . . . With the movie chimpanzee and Sylvania top executives and a glamour girl, Sylvania Electric Products broke ground for a new television tube factory at Fullerton Sept. 11.

Well-done job

R. A. Balzari will retire as the secretary of the Pacific Zone, National Association of Electrical Distributors, when that group meets for its annual fall convention at the Coronado, Oct. 12-14. His successor will probably be voted in at that meeting.

Gird for January

NECA is making an all-out drive in readiness for the next session of Congress. The House and Senate bills aimed at bid peddling and shopping had gone through the various committees and were ready to come to the floor when Congress adjourned. Meanwhile the AGC and some governmental agencies opposing the bill seem to have turned the heat on senators and congressmen who formerly favored passage. Under such circumstances extra effort is needed among these representatives while they are at home. A series of meetings was held across the nation at which James Donohue, assistant to the director of governmental affairs of NECA, Washington, D. C., addressed members and urged increased effort. He met with both the Northwest and California Conferences of NECA Chapters, the Rocky Mountain and Utah-Idaho Chapters in September.

Chapter reunion

Utah-Idaho Chapter of NECA met for two days at Sun Valley, Oct. 2-3, and invited legislators from both states to meet with them and hear the reasons why the federal contract law should be passed. Also on the program to speak for suppliers was R. Belnap, General Electric Supply Co. A general contractor was to speak on the law from the viewpoint of his group. E. J. Moore of H L Electric Co., Idaho Falls, was to report on the success of the estimating course. Charles H. Simpson, vice-president of District 8, NECA, and Matt Sherwood, Western regional director, were to speak of the NECA programs.

NECA doings

Organization work to form chapters or branches of chapters is being done in the north bay section around San Rafael and Santa Rosa in California by the San Francisco Chapter of NECA . . . Up in southern Oregon, Joe Bollinger of NECA field staff has been working to form branches of the Oregon-Columbia Chapter in Portland . . . In San Diego, Al Myers has been elected to succeed Earl Pridemore as president of the chapter. Pridemore resigned for health reasons . . . Negotiations were reopened on all four articles of the agreement in Idaho Falls and Pocatello by the Utah-Idaho Chapter. The scale at $3 is higher than the area rate and lack of business makes all want to face up to the reality. The scale for AEC jobs set the pace.

Men make news

Among people there's this news: Ray Hankins has left Sechrist Mfg. Co. of Denver in which he held a partnership interest. No new connection has yet been announced . . . Hans Shaper, formerly with Peerless Lighting Fixture Co. in San Francisco, has opened a business of his own, Shaper Lighting Products, at 4200 MacDonald Ave., Richmond, as distributor, manufacturer and consultant on lighting . . . Fred Mahler has been given a leave of absence from J. E. Redmond Supply Co., Phoenix, to head up a new organization known as Unistrut-Arizona Service Co. . . . Towner Buckley, formerly with Arizona Public Service Co. in Phoenix, has joined Crouse-Hinds Co. in San Francisco to work with Bill Major, manager, covering northern California area.

Across the bay

Safety Switchboard Co. Inc., which has outgrown its facilities at 1445 Stevenson St., San Francisco, moved its plant and offices to a new building at 910 89th St., Oakland, in September. A sales office for the convenience of San Francisco, peninsula and north bay customers is maintained at 750 Natoma St. in San Francisco, Arnold Fehl announces.

Inspector advice

Attending from the West the meeting of the Electrical Council of Underwriters' Laboratories Inc., in Chicago, Sept. 19, just prior to the silver jubilee meeting of the IAEI, were E. E. Carlton, Division of Industrial Safety, San Francisco; T. A. Lloyd, Board of Fire Underwriters of the Pacific, San Francisco; L. W. Going, chief electrical inspector, Portland; and George J. Tansey, chief, electrical division, Los Angeles. Among the questions they were asked to decide policy upon were: listing motor-driven appliances with heater load, such as clothes dryers, where heater is at 240 v, motor 125 v; USE cable for underground use in conduit and in all some 60 questions. Purpose is to give the laboratories staff the benefit of field experience and conditions of use.

. . . and convention

Both the Southwestern and Northwestern sections of IAEI had about 25 or more men and many of their wives in attendance at the silver jubilee meeting of all sections. Attendance totaled about 1,500. Unfortunately Charles Smith, IAEI secretary-treasurer, well known to the West, was stricken ill after the first day and was unable to see the successful national meeting on which he had worked so hard carried through personally.

Awards

Ed Casey Electric Co. of Seattle was awarded the contract to build a substation of 6,000 kva, 115 kv, at Troy, Mont., and only recently one to install floodlights on the downstream side of Hungry Horse Dam from the power house roof.

Cold or hot

Winter or summer, in Arizona they find an answer for it. An outdoor theater manager in Phoenix installed six wind machines on towers, electric powered, to blow a mist sprayed from a ring at the hub, to cool off the customers in the cars while they see the movie. And Town and Country Lodge is getting ready for winter swimmers by installing electric heating cable in the deck around the swimming pool. With it the air seven feet up from the slab will be kept comfortably warm.

Remnant

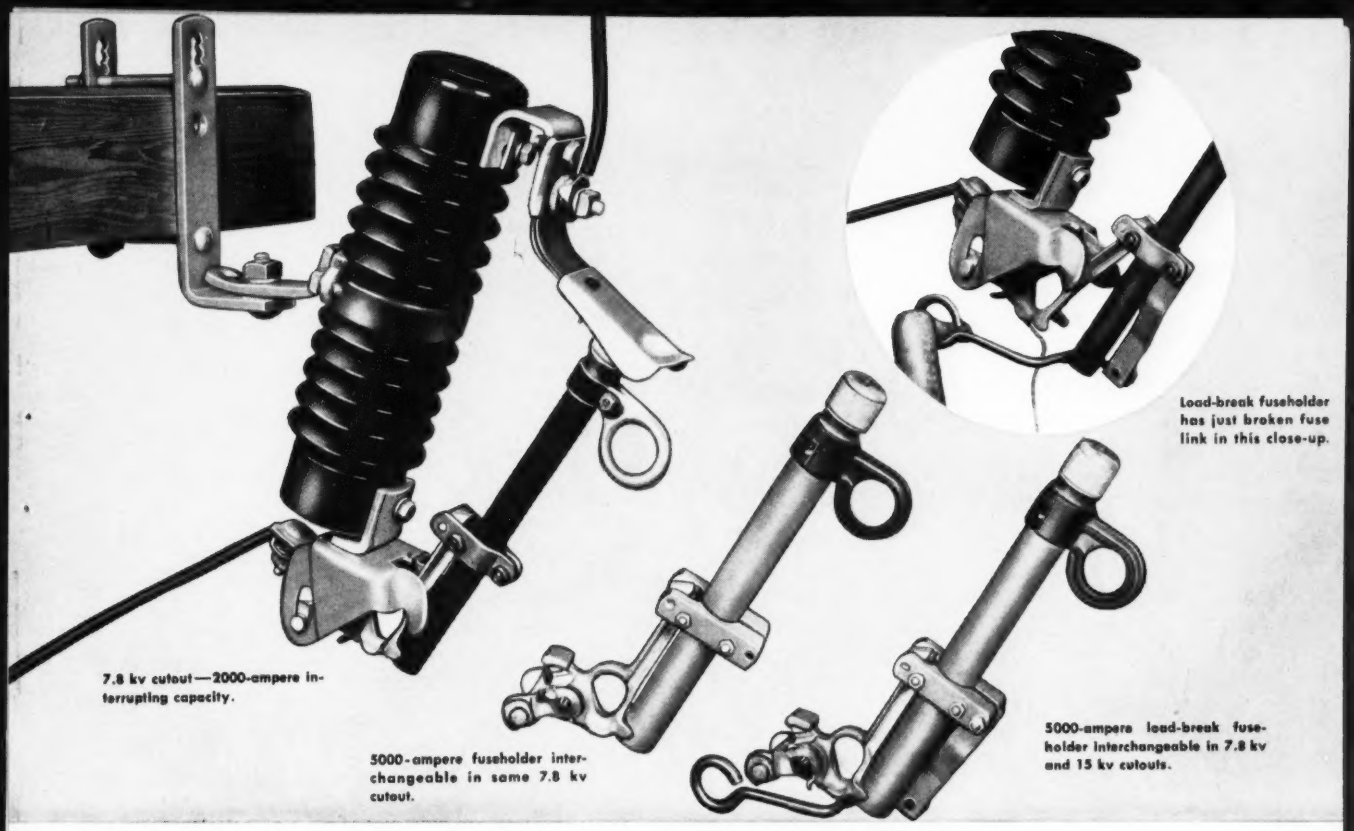
Only thing left of DPA and similar materials control organizations now is establishment of the Business and Defense Services Administration in the Department of Commerce, and it is only there in case materials are needed for defense production. Its peacetime work will be to aid industry in a number of fields of commercial research.

Needs promotion

An Industrial Electrification Council has been formed, with offices in the 420 Lexington building, New York, to promote programs of utilities and manufacturers of industrial heating (electric, naturally) equipment. There will be a conference in Cincinnati, Jan. 18-22, 1954, to prepare a program.

New things

Odds and ends of manufacturer news: Watch for a big announcement of a new motor from General Electric Co. next month . . . Rittenhouse Co. Inc. has a new line of residential door chimes designed to give complete signal use throughout any size home, called Moderncall system . . . Sylvania Electric Products offers contractors a Contractor Thrifty Pack containing fixture, two chain hangers, and cord in a single package . . . There's a self-powered little electric portable hole digger now being made by Eugene John Freeman & Co. called Super Hole-A-Matic, that will dig up to six feet deep, and it's made in Van Nuys, Calif. It can also be used to tunnel under walks and the like.



7.8 kv cutout—2000-ampere interrupting capacity.

5000-ampere fuseholder interchangeable in same 7.8 kv cutout.

Load-break fuseholder has just broken fuse link in this close-up.

5000-ampere load-break fuseholder interchangeable in 7.8 kv and 15 kv cutouts.

NEW G-E OPEN DROPOUT CUTOUT

For FAULT PROTECTION—standard or heavy duty and LOAD BREAK—up to full load at any power-factor.

New simplified design of General Electric 7.8 kv and 15 kv, 100-ampere cutouts have these extra features:

Birdproof Construction accomplished by unique method of clamping the mounting support to the opposite side of insulator from live parts.

Liberal electrical and mechanical strength. New hollow tube wet process porcelain has under-cut petticoats for generous creep and strike distance; and porcelain insert fired within tube provides inside solid barrier between top and bottom live parts. Screen prevents insect nest within porcelain. Clamping U-bolt around porcelain is insulated with molded polyvinyl chloride having excellent insulating and weathering characteristics.

Compression bolting to porcelain—top and bottom fittings are bolted to insulator with porcelain under compression—for maximum mechanical strength. Compression clamps inside the porcelain maintain tight assembly.

Shielded top contact and latch—by roof-shaped contour and having ball-point contact surface to top of fuseholder, the top contact and its latch are protected from dirt deposits and sleet.

Other distinctive features are retained: Hinge guides allow slamming fuseholder from any angle; threaded cap seal at upper end of fuseholder forces expulsion gases downward; silver-plated contacts shielded from corrosive agents; vertical or angle-tilted swivel mounting with EEI-NEMA bracket; latch provides time-delay opening—assures fault current interruption before dropout action occurs; fuseholder tube of fiber and fabric-base Textolite* is water resistant, will not warp or split; close coupling of fuseholder to porcelain prevents multiplication of recoil forces.

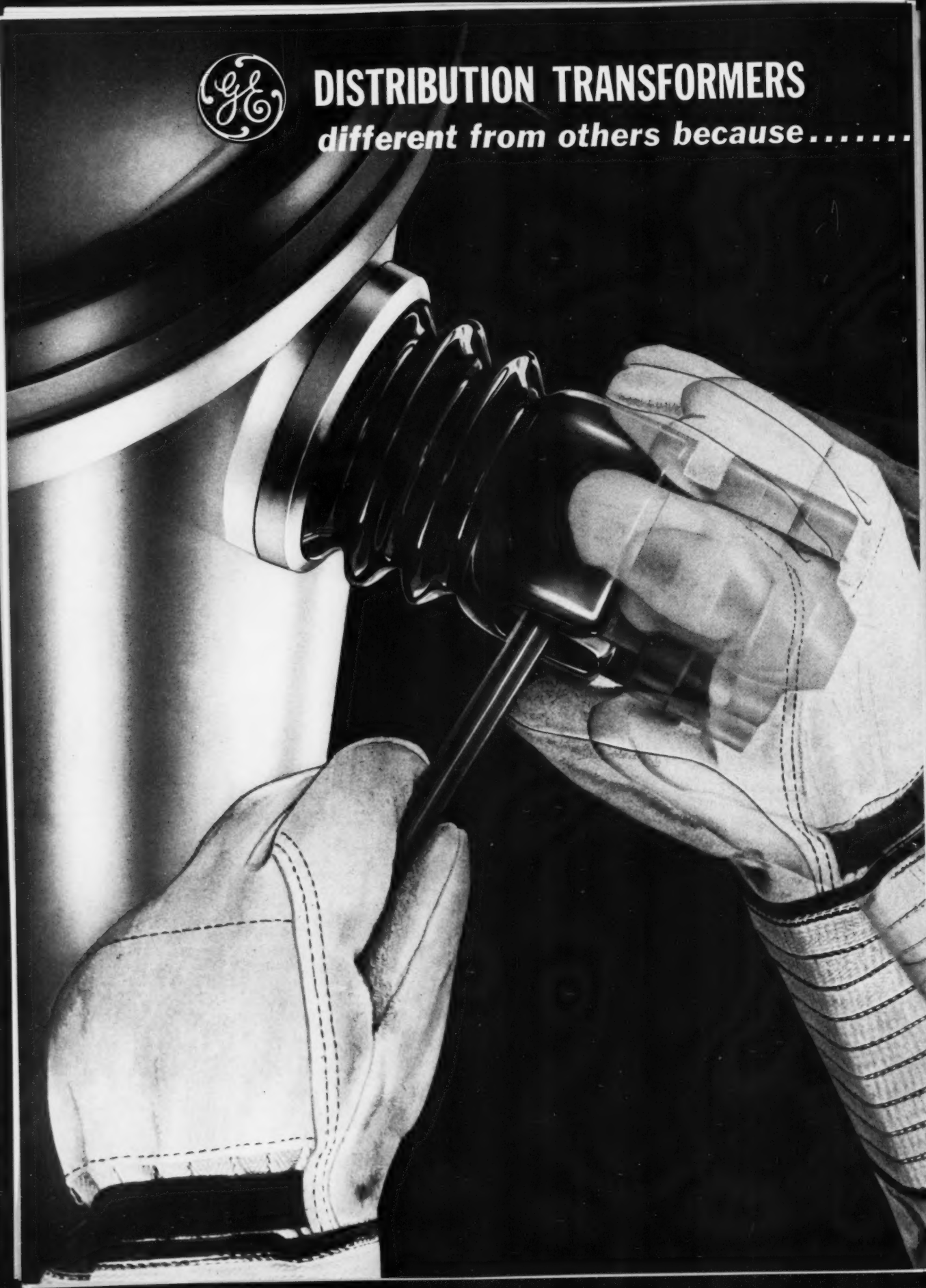
For more information on these new open cutouts, contact your nearest G-E Sales Representative, or write to General Electric Company, Section 433-4, Schenectady 5, New York.

1878 75 1953 YEARS OF ELECTRICAL PROGRESS

*Reg. trade-mark of General Electric Company

You can put your confidence in—

GENERAL ELECTRIC


DISTRIBUTION TRANSFORMERS
different from others because.....

....Insulated clamp-type connectors *on tank-wall hv bushings...permit safer, faster connections...without tools*

Insulated clamp-type connectors on General Electric distribution transformers eliminate exposed live parts . . . permit installation of cable from either side . . . faster connections *without* tools. This plus feature is standard on all G-E Spirakore* distribution transformers 5 kv and below.

HIGH-VOLTAGE BUSHINGS of wet-process porcelain are mounted directly on tank wall using one-piece *stainless steel* clamping band. A twist of the wrist is all that's needed to clamp cable securely. Insulated cap is "spin-free"—will not drop off when unscrewed.

REMEMBER... all transformers are not alike . . . compare the General Electric plus features in the chart below and see for yourself.

For more information on distribution transformers, either unit-type or conventional, contact your nearest G-E sales office, agent or distributor, or write to General Electric Company, Section 431-8, Schenectady 5, New York.

*Registered trade-mark of General Electric Co.

You can put your confidence in—

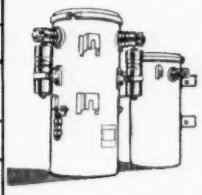
GENERAL ELECTRIC

ALL TRANSFORMERS ARE NOT ALIKE

(make this simple comparison and see)

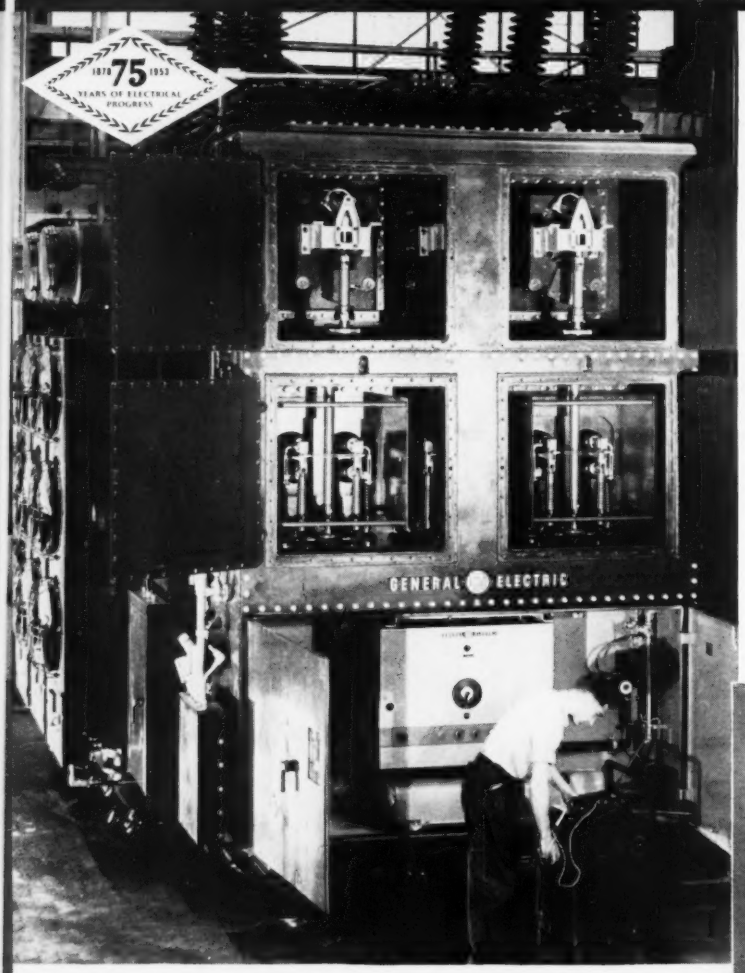
FEATURE	General Electric	Mfr. A	Mfr. B	Mfr. C	Mfr. D	Mfr. E
Production-line impulse testing	YES	NO	NO	NO	NO	NO
Nitrile rubber gaskets at all tank openings	YES	NO	NO	NO	NO	NO
Strenicor pressure terminal clamps	YES	NO	NO	NO	NO	NO
Insulated clamp-type connectors on tank wall hv bushings	YES	YES	YES	NO	YES	YES
One-piece cover band	YES	NO	NO	NO	NO	YES
Terminals designed for both copper and aluminum conductors	YES	NO	NO	NO	NO	NO
Gapped valve-type arresters	YES	NO	NO	NO	NO	NO
Nationwide company-operated service facilities	YES	YES	NO	NO	NO	YES

1879 75 1954 YEARS OF ELECTRICAL PROGRESS



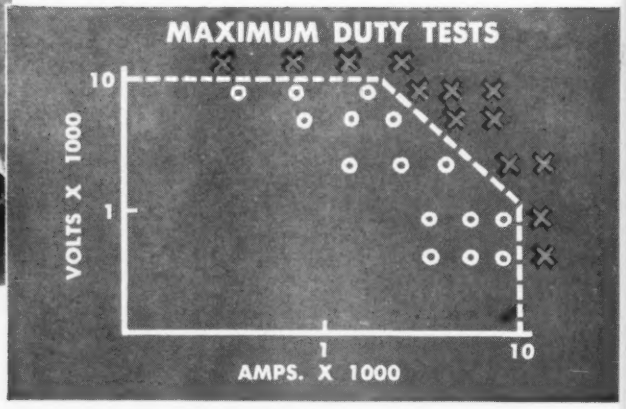
UNIT-TYPE CONVENTIONAL

"Take your choice G. E. makes both"



FINAL TESTS on control wiring are made prior to shipment. Large, hinged doors, re-usable Nitrile rubber gaskets, and roomy compartments simplify field inspection and maintenance.

No need to worry if a short circuit occurs during a tap change



G-E Load-Ratio-Control operates successfully even under maximum short-circuit duty

If a system short circuit occurs while a tap change is under way, General Electric Load-Ratio-Control is designed to complete the operation successfully . . . *even under the maximum short-circuit duty to which the transformer may be subjected.*

Contactor interrupting tests, made during the design of each standard LRC mechanism, assure you of dependable operation. Oscillograms of each test shot record the current and voltage values and the arcing time. These points are plotted on a logarithmic chart like that shown above. Points showing excessive arcing time are recorded as crosses. Satisfactory tests are recorded as circles. A line enclosing area of satisfactory performance under short circuit defines the range of normal application of contactor.

From such test data, G-E transformer designers are furnished an application chart for each standard equipment that shows the range of transformer ratings to which the equipment can be applied.

Remember too, that in G-E load-ratio-control, the four design factors: insulation life, arcing-tip life, mechanical life and short-circuit duty are all *co-ordinated* to give you good service, longer periods between inspection and less maintenance.

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THE MONTH IN BRIEF

Group to Push Basin Development

Columbia Basin Interagency Committee gave its stamp of approval to Idaho Governor Len Jordan's plan to put top executives of four Pacific Northwest states to work on what Jordan calls the "other half" of the partnership concept of federal power policy. His aim is to get local interest groups behind a program of scheduled projects; agreement on which could best be built by private utilities or public agencies, the states or the federal government; if possible, support of one new development for which Congress would be asked to appropriate funds in January. A governors' conference will be called soon to organize a new CBIC committee, which will function as an adjunct to CBIC but will move into a broader field. CBIC is basically an organization for coordinating technical planning by state-federal agencies. The new committee will deal with political aspects of basin power development.

PGE Gets Clackamas Permit

Oregon Hydroelectric Commission has approved application of Portland General Electric Co. for a rock earthfill dam at Timothy Meadows on the Upper Clackamas River. The project will firm up 10,500 kw additional capacity to three downstream plants. Completion is scheduled for 1955. An FPC permit had been granted previously.

Hells Canyon Hearings Delayed

Opponents of Idaho Power Co.'s plan for a three-dam development at Hells Canyon succeeded in getting a two-week extension of the hearing recess. Examiner William J. Costello changed the date from Sept. 21 to Oct. 5 after FPC had denied postponement motions of the National Hells Canyon Assn., which favors a federal high dam. Denied a three-month delay before FPC recessed hearings on Aug. 20, the association later tried for postponement to Oct. 12 or Nov. 9.

Outlook Good in Northwest

Firm power users in the Pacific Northwest were told last month that they could count on normal power supplies next winter. According to C. A. Erdahl of Tacoma, chairman of the Pacific Northwest Utilities Conference, the situation looks very good. Additional storage facilities and adequately filled reservoirs make unlikely a recurrence of last winter's firm power cuts.

Added Tax Proposed at Tacoma

Tacoma's public utilities board has asked the city council to raise the gross earnings tax on its light division from 7½% to 8%, maximum allowed under the new city charter. This will amount to $60,000 a year.

Washington Power Law Upheld

In a 6-3 decision, the Washington State Supreme Court ruled that the 1949 Washington Power Act is constitutional (see p 134). The 1949 law is the legal basis for proposed purchase of Puget Sound Power & Light Co. properties by a group of Washington PUDs.

UP&L Signs for Natural Gas

Utah Power & Light Co. has signed an agreement with Mountain Fuel Supply Co. for natural gas to be delivered to its Hale and Gadsby steam plants on an interruptible basis. The gas company will make available up to 32,000,000 cu ft daily, enough to supply one boiler at Gadsby and one at Hale plant. Situated in a coal country, UP&L previously has fired all its boilers with coal.

Long-Term BPA Contracts Signed

Three Northwest power companies last month signed 20-year contracts for Bonneville power and two others were expected to do so within a short time. Redrafted after an earlier proposal met objections from aluminum companies and public agencies (EWEST, July, p 128), the contract gives private companies the right to 1,500,000 kw. Major provisions: (1) public bodies still have priority; (2) 500,000 kw of firm power will be allotted to utilities before direct BPA industrial customers get more than their present 1,052,460 kw; (3) the next 70,000 kw will go to firm up existing loads of direct industrial customers; (4) the next 1,000,000 kw of firm energy, when available, will go to private utilities; (5) both private and public power groups will be limited in adding industrial loads of 10,000 kw or more. The agreement, signed by Portland General Electric, Pacific Power & Light and Mountain States Power companies, must be approved by Interior Secretary McKay.

Imperial Plant Up to Voters

Directors of the Imperial Irrigation District at El Centro, Calif., have approved a proposed $10,000,000 power development project. A bond election to finance the entire amount will be called in November. Plans call for a 33,000-kw hydroelectric plant at Pilot Knob on the All American Canal, 20 miles downstream from Imperial Dam.

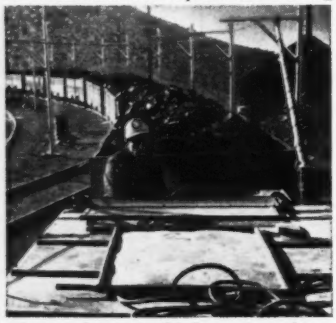
Aluminum Fabricating Plant Planned

Reynolds Aluminum Co. is reported negotiating for a firm power contract with the Bonneville Power Administration to establish a fabricating plant on the Columbia River below McNary Dam. Umatilla, Ore., city officials say the Reynolds company may locate near their community, about 40 miles west of Walla Walla, Wash.

what's NEW in Engineering

Laboratory facilities for engineering research are available to individuals and groups with worthwhile projects at Richmond Engineering Field Station, administered by Department of Engineering, University of California. Charges are based on actual expenditures with appropriate overhead. For information, write Institute of Engineering Research, University of California, Berkeley.

Rebuilding a near-ghost mine at Sunnyside, Utah, for greater coking-coal production with higher efficiency, is a current major project of Kaiser Engineers. The original Sunnyside mines, opened in 1896, were in bad condition. The problem was to rehabilitate and expand two existing



mines and open a third to raise coking-coal production from 1,000,000 to 1,715,000 tons per year. We'll send you a reprint of an article by Wesley Hyatt and R. G. Heers in *Coal Age* which tells the full story of Sunnyside's emergence from a "near-ghost" to one of the most efficient and modern coal producers in the West.

A $50,000 bonus goes to the first person to bring in a Tennessee oil well that will produce 50 barrels a day for six months, according to a new state law. Only 35 wells are now producing in Tennessee, but geologists think the State has rich oil possibilities.

When it comes to research, preliminary engineering studies, engineering design and layout, estimating, preparation of specifications, construction programing, negotiation of contracts, and procurement and expediting of materials and equipment—call or write: Kaiser Engineers Division of Henry J. Kaiser Company, Kaiser Building, Oakland 12, California.

THIS MONTH'S NEWS

Power Allocations Discussed By Compact Commission

The 45-member Columbia River Interstate Compact Commission, meeting Sept. 11 at Yakima, Wash., reached substantial agreement on including the question of hydroelectric power allocation in the compact. A committee was appointed to make up a report that would embody the essence of reports made by six states touched or drained by the river.

Biggest difference between the states was over the amount of voice the compact should have over the allocation of power, with downstream states arguing for broader powers than upstream states thought desirable.

Lloyd I. Wallace of Montana argued that most of the benefits of the dams are felt by the downstream states and that in return the headwater states should receive needed power allocations from the lower states. Jack Rogers of Washington agreed and made the following four suggestions: (1) upstream states should have the use of power furnished by projects within the state; (2) upstream states should have the use of power produced in lower states; (3) upstream states should make surplus power available to other states, with right to recapture, if and when it can be done; (4) all power within the area should be pooled for the most economic use.

Washington PUD Law Held Constitutional

Constitutionality of the 1949 Washington Power Act permitting two or more PUDs to acquire power facilities jointly was upheld last month by the Washington State Supreme Court. Six of the nine judges affirmed the lower court verdict.

The 1949 law was challenged by Ed Roehl of Wenatchee in an action against PUDs participating in the five-county plan to purchase properties of Puget Sound Power & Light Co. Roehl sought to restrain the Chelan PUD from participating in the plan and to prohibit the Kitsap PUD from consenting to the purchase, although not participating.

In a dissenting opinion, Judge E. W. Schwellenbach declared that constitutional restrictions were ignored and violated in enacting the 1949 legislation. The majority, however, declined to enter into the legislative history of the act for determining whether that part of the law was enacted in violation of the constitution. One of the six judges concurred in this majority ruling, although in a previous case he had expressed himself in favor of going behind the face of enrolled bills.

Roehl's attorneys contended that the 1949 power measure was too broad, that it contained two other bills almost verbatim.

The majority opinion, written by Associate Justice Frederick Hamley, ruled that the act was not an amendment to the 1931 law but supplemental to it. (The older law states that districts may not acquire facilities outside the district and provides no authority for mutual agreements looking to joint acquisition of integrated electric systems.)

The court also ruled that validity of a joint purchase in this case was not dependent upon the seller's obtaining prior approval from the state public service commission.

Management Consulted on BPA Appropriations

Appropriation requests to be made by the Bonneville Power Administration to Congress were discussed by BPA officials with members of the Pacific Northwest Conference Committee at a meeting in Tacoma, Wash.

This attempt to get "clearance" from top power management on future needs is a new development, said Dr. Paul J. Raver, BPA administrator. The committee will seek to get transmission facilities in line with hydroelectric projects now under construction so that prompt power transmission will be possible when new generators go into operation.

• **REA** granted the Inland Empire Rural Electrification Inc., of Spokane, a $410,000 loan for system improvements. Included in the plans are an underground cable system to permit operation of a television station atop Mount Spokane, and a 13-mile connection to the Washington Water Power Co. substation near Palouse, Wash.

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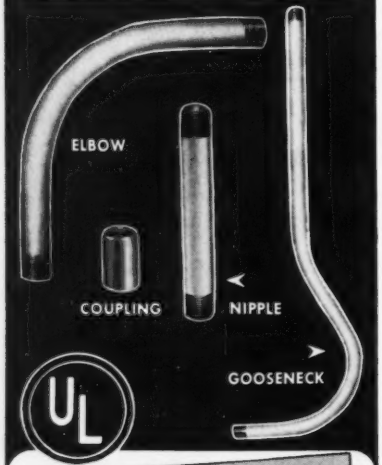

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TACOMA BOARD DROPS CODE PROPOSAL

The public utilities board at Tacoma, Wash., agreed to set aside its proposed administrative code after City Manager Frank Backstrom offered to amend the city's regular administrative code to give greater freedom to the utilities in conduct of their departments.

The board originally sought a code which would have set up separate legal, financial, personnel and purchasing departments for the utilities, in addition to those already established under the city manager's administrative code. Strong objections were made not only by Backstrom but by the city council and the Municipal Civil Service League, after which a compromise was reached.

Certain sections of the utilities code will be incorporated in the city code, allowing maximum freedom for the light, water and belt line divisions, Backstrom said. An addition will be made to the city purchasing agent's office to handle utilities buying while a member of the regular city attorney's staff will be assigned to handle utilities problems. The city's central personnel office will handle recruiting duties for utilities but special training and safety programs will continue under light department jurisdiction.

The utilities will maintain a staff as needed to supplement the work of the city's regular finance department.

The board said it will begin a nation-wide search for a director of utilities not later than November. C. A. Erdahl, acting director, will have to make application along with others seeking the job, said Gerritt VanderEnde, board chairman. The city council is expected to approve the board's plan to pay the director an annual salary of $16,000.

An extensive advertising program has been halted until a utilities administrative code can be established setting up a public relations staff to govern advertising outlay. Adoption of a code has been delayed because of differences between the board and the city council as to the degree of separation between the utilities and other city departments.

• **Organization** of county chapters of the National Hells Canyon Assn., which favors a large federal hydroelectric dam on the Snake River as opposed to Idaho Power Co.'s low-head proposals, got underway in Oregon's Lane County with election of Charles O. Porter, Eugene, as president of the local group. Charles Sweitzer was named secretary at the meeting when plans for sponsoring a public assembly were laid out in a resolution calling for promotion of public power in the Pacific Northwest. Financial help for the national organization was added by the Oregon Farmers Union at its August meeting when contribution of $500 was authorized to support NHCA's campaign against the Idaho private utility company's three-dam plan.

Pioneer Plant Renamed To Honor Builder

One of the West's pioneer hydro plants, Portland General Electric's Willamette Falls development at Oregon City, has been renamed for T. W. Sullivan, who supervised its construction in 1895. Redevelopment work at the plant has increased its capacity from 5,000 to 15,400 kw. At recent dedication ceremonies, Vice-president George E. Sullivan, son of T. W. Sullivan, unveiled the new name plaque.

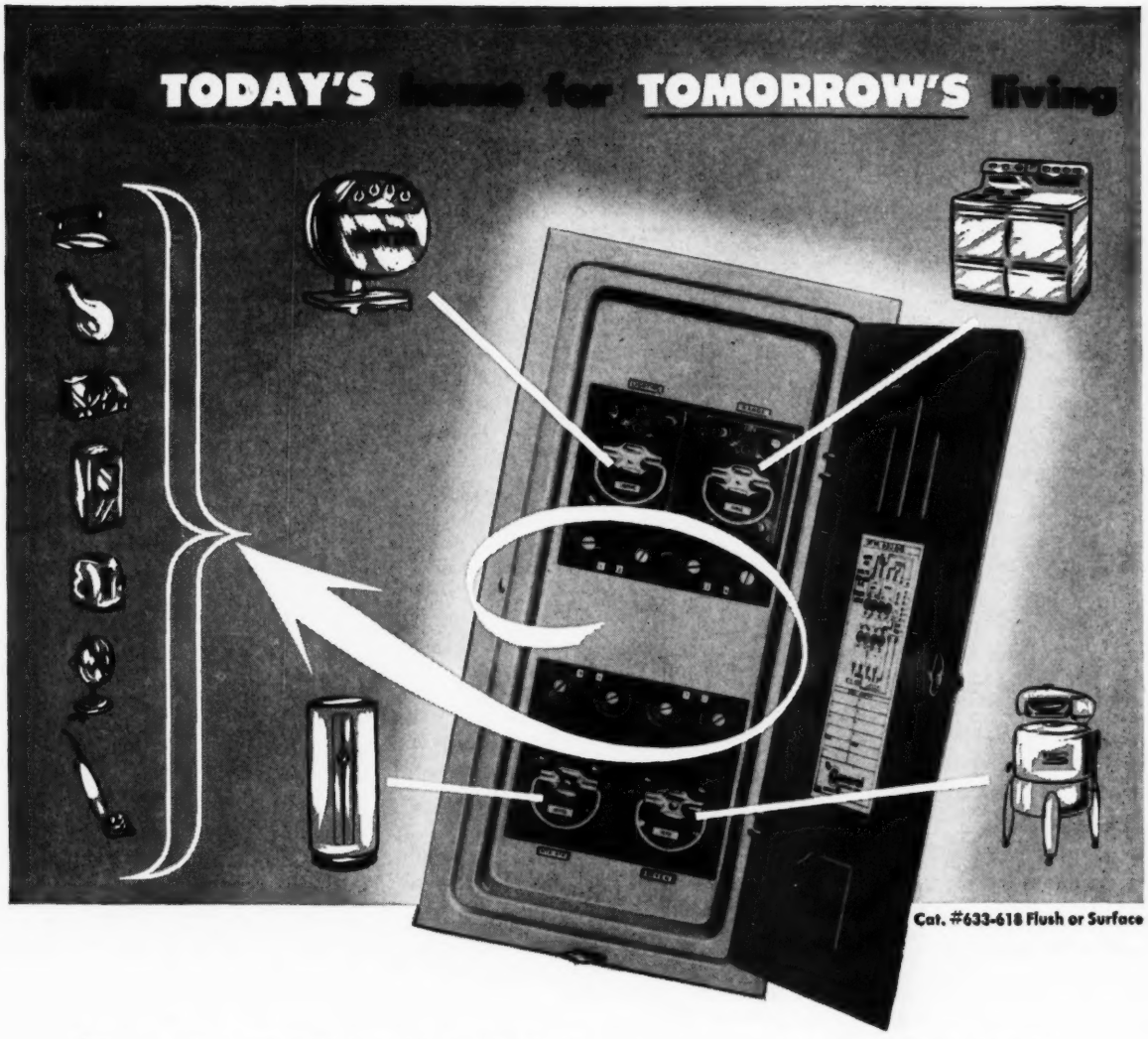
• **Plans for Pit No. 7** plant have been announced by Pacific Gas and Electric Co. The project consists of a diversion dam and 54,000-kw power house, plus a small afterbay regulating dam. It will cost about $16,250,000.

• **Construction work** is nearly 30% complete at Denver on the 60,000-kw extension of the Zuni steam electric station of Public Service Co. of Colorado. R. F. Throne, chief mechanical engineer, said the new generator has been serviced and has been set in final position. The scheduled date of trial operation for the turbine generator is Feb. 1, 1954, and for the steam generator June 1, 1954. Project cost is estimated at $10,875,000.

• **Utah Power & Light** Co. has completed a new 31-mile long, 44,000-v line to Moab in southeastern Utah, scene of a uranium mining boom of considerable proportions. The new line taps UP&L's 130-kv system at Crescent Junction. Power enters the community at a new 600-kw substation. Cost, including substation and feeder circuits, was $144,000, officials said.

• **Cowlitz County PUD** of Longview, Wash., has adopted a preliminary budget of $3,630,000 for 1954, including $660,000 for construction. Construction will include three $100,000 substations and transmission lines to the new substations.

• **Heaviest single item** sent to the islands by ship in five years, a new generator for Maui Electric Co. has been supplied by Westinghouse. The $140,000, 57-ton generator will double capacity.



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FLATHEAD VALLEY GETS LOWER SCHEDULES

Montana Public Service Commission has approved Mountain States Power Co.'s application for lower Flathead Valley electric service rates. The reduction is not a percentage cut but different in each individual field. The application followed contracting by the company for power from Hungry Horse Dam nearby.

The new rates are: commercial, 4c for first 150 kwh per month; 3c for next 350 kwh; 2c for next 1,500 kwh; 1c for next 13,000 kwh; 9 mills for next 25,000 kwh; 7 mills for next 200 kwh of renewal; 6 mills for the excess of kw per month. Minimum charge for commercial service will be $1 a month for single-phase and $3 per month for three-phase service. There is no charge for first 10 kw of demand and in excess of 10 kw the charge is $1.20.

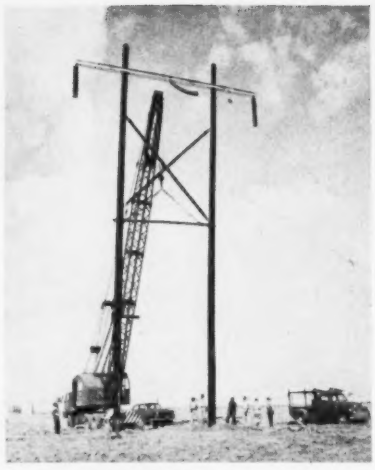
The residential rate is 4c for the first 50 kwh; 2c for next 100 kwh; 1c for next 100 kwh; 8 mills for next 550 kwh and 1.5c for excess. The minimum monthly charge for residential will be $1.

L. A. Department Asks New Electric Rates

New water and electric rate schedules have been submitted for Los Angeles city council approval by the city's board of water and power commissioners. The schedules are essentially the same as those which were proposed last June and returned by the council for restudy by commissioners appointed under the new city administration which took office July 1.

Electric schedule is a readjustment in charges for various types of services, and will mean no increase in revenue. Proposed water rate changes would result in an increase of about 20% in water revenue.

• **Pacific Power & Light** Co. has started work on a 66-kv transmission circuit from Bend substation to Midstate Electric Cooperative's new Redmond-La Pine line, connected with a Bonneville Power Administration substation at Redmond. PP&L District Manager W. A. Lackaff reports the tie line, to cost $37,500, will be used temporarily while the company converts the present Redmond-Bend transmission line from 22 to 66 kv. Upon completion of the two projects, the connection with REA will be maintained as a stand-by. Another phase of the Bend program calls for $90,000 additions to the main substation.



SHORT WORK MADE OF LINE CONSTRUCTION—28 miles of 220-kv transmission line were built in 30 days by Bechtel Corp. to complete an important job for PG and E in San Joaquin Valley

Record Set on Line Construction Job

To complete 28 miles of 220-kv transmission line in 30 working days requires mechanization and job coordination. This record was set by Bechtel Corp. crews in building an important line for Pacific Gas and Electric Co. in the San Joaquin Valley of California.

The line consisted of 12 steel towers 52 ft high and 187 H-frame wood structures varying in height from 55 to 90 ft. With the aid of a crane, steel towers were erected in less than two hours each. H-frames were completely assembled on the ground and lifted by crane. Reels each containing 7,000 ft of 605,000 cir mil ACSR were moved along the right-of-way on dollies for conductor stringing. Two steel ground wires also were installed.

Use of 60 pieces of radio communication equipment speeded operation and aided Superintendent Jim Reimers in meeting an urgent schedule two days before the deadline.

• **The 1954** city budget at Seattle includes a wage increase for City Light linemen from $2.54½ to $2.65 an hour, with the same percentage increase for all other electrical workers in the department. All city employees will get wage increases under the new budget, ranging from $5 to $25 a month, with the average around $15.

• **Homer Electric Assn.** of Homer, Alaska, has received an $824,000 loan from REA for construction of electrical distribution lines.

NEW SYSTEM CUTS AERIAL FISH PLANTING COSTS

The cost of aerial fish planting in California has been slashed from $2.98 per 1,000, when the large scale program began in 1949, to $1.25 per 1,000 this year.

The primary reason for the record year, according to the California Department of Fish and Game, is perfection of a system of drugging the fish in transit.

The addition of sodium amytal to water in the carrying cans calms the fish so that they use less oxygen and need less water, it is reported. As many as 6,800 trout fingerlings were transported in four gallons of water.

Senior Warden Pilot A. L. Reese, who perfected the drugging process through experimentation, reported the year's total of fish plantings from the air in 662 lakes is 2,864,000. The previous record was set in 1951, when 2,769,000 trout landed in 632 mountain lakes in California.

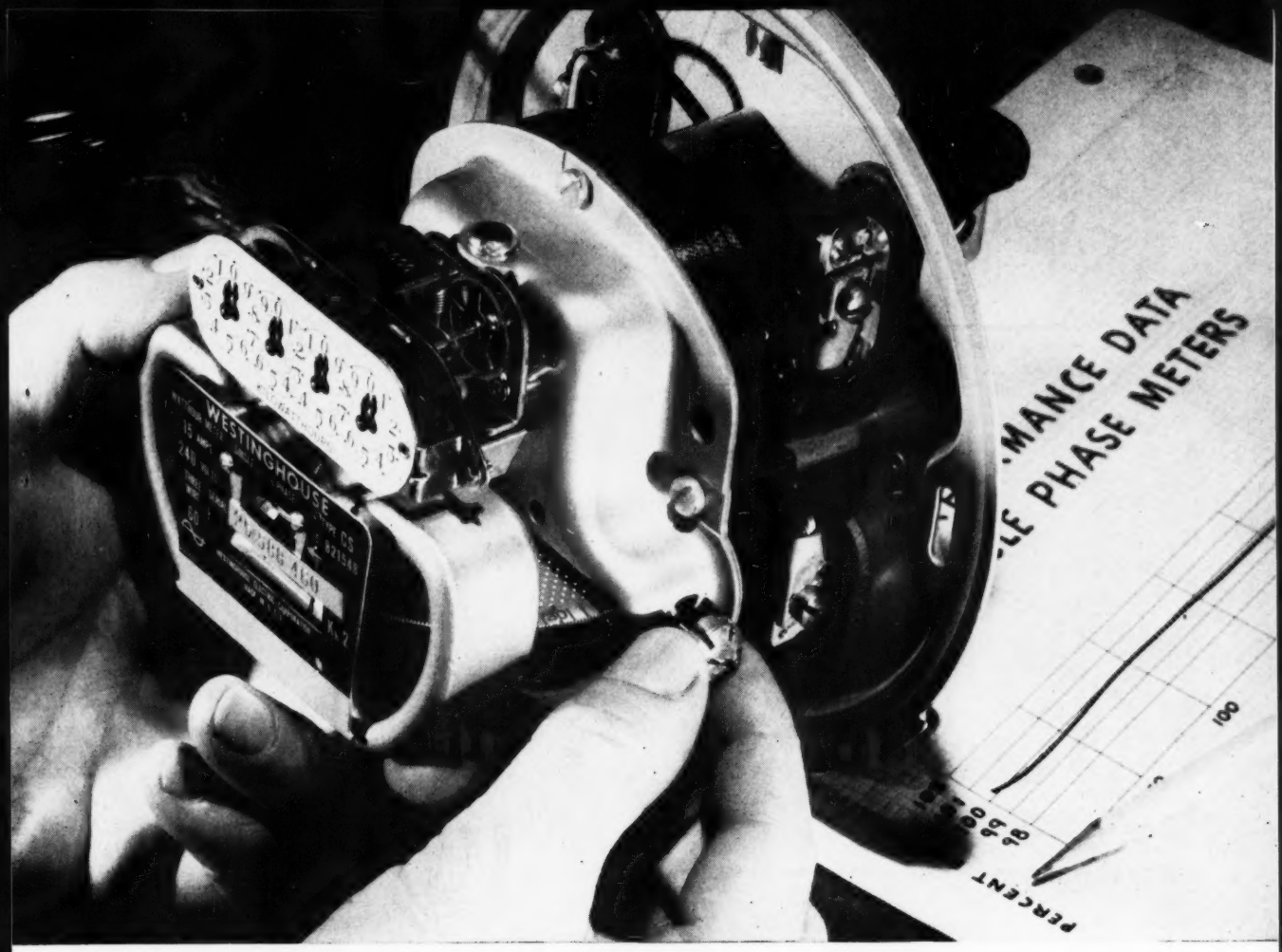
From the Oregon border to the Tehachapi Mountains, Reese and his two pilots spent 105 hours in the air ferrying and planting the fish. Last year's flying time was 124 hours and in 1951 the plane logged 142 hours.

Funds Allotted for Fish Guidance Research

U. S. Fish & Wildlife Service has received an $80,000 allotment from the Corps of Engineers to begin a three-year program of electrical fish guidance research in connection with the problem of passing fish over dams, according to an announcement at Seattle, by Clinton E. Atkinson, chief of Pacific Salmon Investigations for the Service. A total of $228,000 has been allotted for the three-year program.

Laboratory experiments have been conducted at Seattle for the past year to determine the reaction of fish to electrical current patterns, with the resultant discovery of the lethal limits of electrical current for two species. Under the new program, fisheries biologists plan to carry out field experiments, first in several tributaries of the Columbia River. Stream bed conductivity will be tested and studies conducted to establish the most effective electrical fields under actual stream conditions.

Experiments have shown that young fish can be guided by pulsating direct-current away from the churning turbine wheels of hydroelectric dams that presently destroy many fingerlings on their way downstream.



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TAX LEVY UNLAWFUL PUD SUIT CONTENDS

Wasco County, Ore., PUD has filed suit in circuit court asking a declaratory decree to prevent Wasco County from collecting taxes on PUD properties for three years, 1950 through 1952, and a ruling that levying of the tax was unlawful and void. At the same time the PUD and the board members asked a temporary restraining order enjoining the county officials from taking other steps to collect the levied amounts claimed by the county to be delinquent.

The action was expected after the PUD and Wasco officials conferred earlier on the plan of the county sheriff and tax collector, Ernest D. Mosier, to attach the property and garnishee the income of the district. Arrears of $17,819 plus interest are claimed by the county on the basis of valuations for the three years. In the state tax commission books the PUD's facilities are listed as having a cash value of $215,000 as of Jan. 1, 1953.

In the complaint the PUD argues it is a public and municipal corporation and as such is exempt from taxation under Oregon laws of 1949 and restated in revised code of 1953. The complaint states: "There were and are many other similar public and municipal corporations whose properties were and are not so assessed and levied upon." There is a possibility, however, that the case may eventually wind up in the Oregon Supreme Court. The PUD cites in its brief laws under which it states property taxes "have reportedly been collected from other PUDs in Oregon" and declares these are unconstitutional since they seek to "impose a tax which is not uniform on the same class of subjects within the state."

Power Company Properties Taken by District

The last Washington Water Power Co. holdings in Pend Oreille County, Wash., were taken over last month by Pend Oreille PUD No. 1 under a court order signed by Superior Judge Lon Johnson. Condemnation proceedings began in 1947 and the court declared public necessity in June 1948. A price of $200,000 was fixed last spring.

The WWP facilities in Pend Oreille County included the Dalkena 750-kw power plant on Calispel Creek, and transmission lines serving approximately 300 customers. Purchase of the WWP lines gives the county PUD exclusive distribution to towns in Pend Oreille County.

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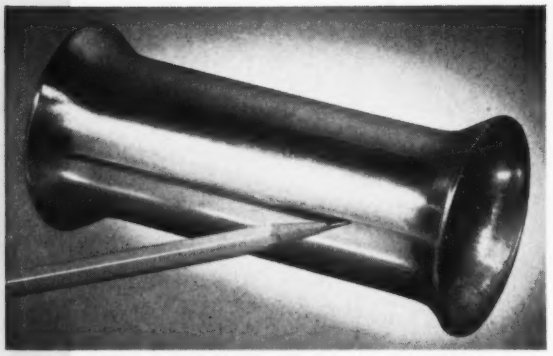
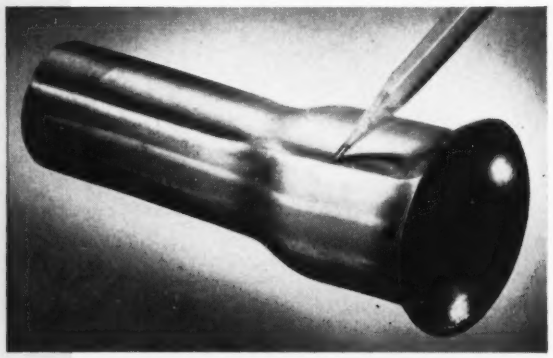
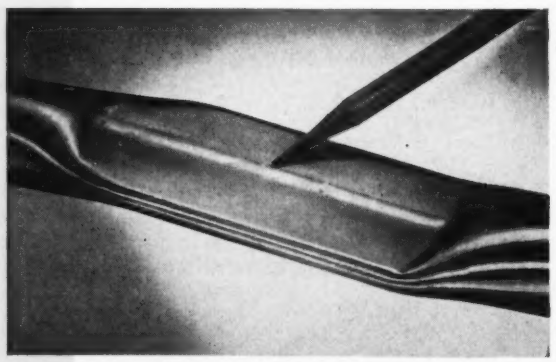


Thousands of pounds of pressure were used to flare this piece of Rome • RIGID like a trumpet at both ends. Yet, note how the weld remains firm.



Despite expanding more than 25%, followed by flaring, the weld here again remains as sturdy as ever.



Smashing blows like those of a drop hammer have flattened this piece of Rome • RIGID. Yet they could not disturb its powerful electric weld.

Available in 10-foot straight lengths, as well as 90° elbows. Sizes are ½", ¾", 1", 1¼", 1½" and 2". Fully approved by Underwriters' Laboratories,. Inc., Rome • RIGID meets all requirements for safe steel raceway . . . plus uniformly high quality. See your electrical wholesaler or call your nearest Rome Cable office today.

show why you get extra safety with Rome • RIGID steel conduit

The rigid conduit you install will never have to undergo tests any more severe than those put to these pieces of new Rome • RIGID.

Gruelling tests

Look at them. One has been flared like a trumpet at both ends. Another has been expanded more than 25%, then *flared*. Still another piece has been flattened by a force having the impact of a drop hammer.

Weld holds firm

Yet in all cases the weld holds firm. That is because Rome • RIGID is cold formed from shot blasted steel and electrically welded. In fact, it is the only rigid conduit in sizes ½" to 2" to be formed and welded in this way.

Advantages of electric welding

In addition to providing you with extra strength, the electric welding of Rome • RIGID also assures you uniformity of ductility, dimensions and concentricity.

Cleanest surface known

You'll find no oxidation and no scale on Rome • RIGID. The unique cold forming process eliminates these hazards often found with hot formed pipe.

Exceptional corrosion resistance

Perhaps, most important of all is the superior resistance to corrosion you get with Rome • RIGID. This is the only rigid steel conduit hot dip galvanized by Armco's patented Sendzimir process.

In this process the pipe is precisely heated, burning off all surface dirt, grease and scale. The surfaces are reduced to virgin metal, then cooled in the same atmosphere without ever coming in contact with the air.

The virgin clean surfaces are instantly coated with pure zinc inside and out. This uniform bond between bright, clean metal and molten zinc eliminates flux and assures years of safe, trouble-free service.

Easy to install

The Sendzimir process also provides uniformity of temper, plus easy fishing and pulling of wires.

Uniform diameters and careful threading assure simple connections, materially cutting installation time and costs.

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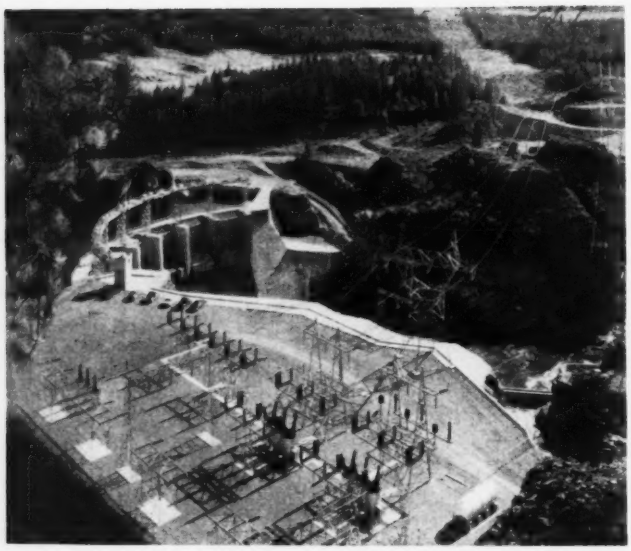
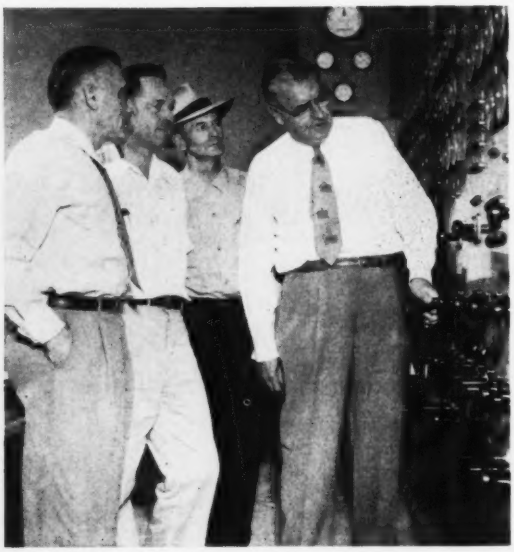




Fourth and final 50,000-kw generator went on the line at Washington Water Power's Cabinet Gorge Dam 32 months after construction was started on the hydro development. The dam lies in a rocky curved canyon 350 ft high where the river flows 95 ft deep. At left J. E. E. Royer, WWP vice-president and general manager, throws the switch. Standing by are M. L. Blair, power supply chief; G. B. Morris, Ebasco project manager; W. D. Hart, chairman of the Bonner County, Idaho, board of commissioners

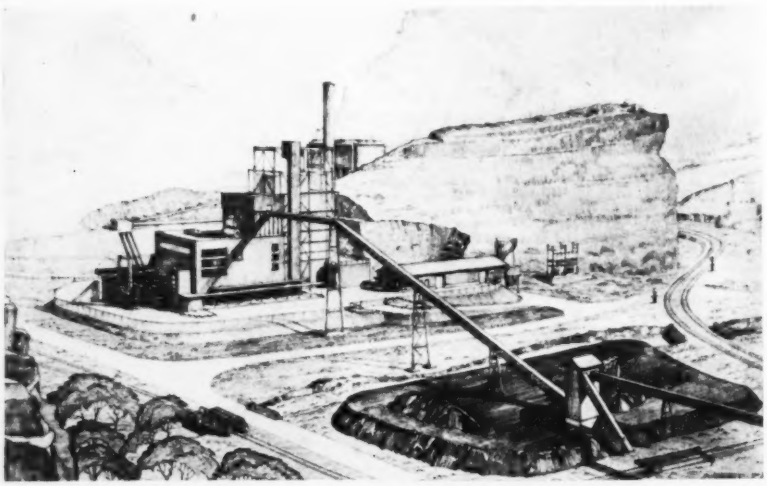
B. C. Electric Surveying Potential Power Site

Engineering field crews are surveying a possible $25,000,000 power development for B. C. Electric Co. on the Cheakamus River, north of Squamish, upcoast from Vancouver. The survey, to cost some $100,000, will start 10 miles north of Squamish and work another 25 miles upstream.

Part of a long-range program, the Cheakamus project would develop 120,000 kw.

BCE recently received unanimous approval for the survey from Vancouver City Council, which has held a development reserve on the site, 70 miles north of Vancouver. The city of Vancouver has never proceeded with hydro development.

If tests prove satisfactory, BCE will apply to the provincial government for permission to proceed with the project.



Utah Power & Light Co. has started work on its $10,500,000 Carbon plant at Castlegate. The 66,000-kwh plant will be operating in late 1954; is expected to use 750 tons of coal daily. Fuel will be brought direct to the plant by conveyor system from a nearby bituminous coal mine. This plant is part of a $26,000,000 UP&L construction program

Department Proceeds With Plans for Overhead Line

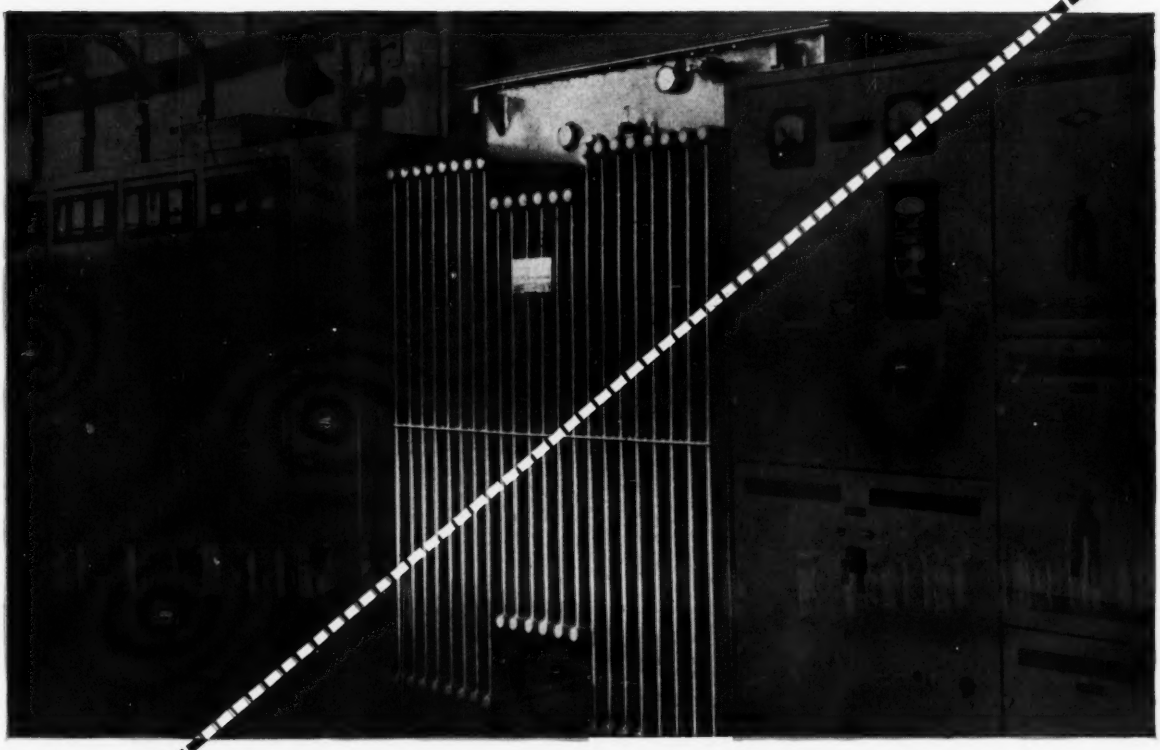
The board of commissioners of the Los Angeles Department of Water & Power has instructed its attorneys to seek a court order of possession for remaining property needed for a transmission line connecting receiving station J in San Fernando Valley with a terminal on the south side of the Santa Monica mountains.

The department's plans to build an overhead line on the 12½-mile route have met strenuous objections from San Fernando Valley property owners, who want to see it placed underground. But the department, quoting costs ($3,043,000 for an overhead line as against $12,028,000 for an underground line), has stuck to its original plans, with the backing of Los Angeles' Mayor Norris Poulson.

Approximately 80% of the necessary property has already been purchased or taken under option. A court order of possession would enable the department to use the remaining land pending purchase through negotiation or condemnation. Construction is scheduled to begin later this fall.

• **Pacific Gas and Electric** Co. has ordered two 50-ton butterfly valves from Westinghouse for use in its Pit River No. 4 hydro plant under construction north of Redding, Calif. Delivery of the valves, to be built at Sunnyvale, is scheduled for a year from now.

Where DEPENDABILITY really counts



MOLONEY Askarel Load Center Transformers do the job

Since the health of an entire city can depend upon its waste disposal system, the City of Los Angeles set the most rigid specifications for equipment in its Hyperion Activated Sludge Plant. This Load Center—the heart of the entire operation—must function around the clock and around the calendar with exceptional dependability.

Moloney Askarel Load Center Transformers were incorporated in these Load Centers, not only because they met the specifications, but because they are noted for their ability to provide continuous, reliable service under all operating conditions. Since they are installed indoors, these transformers are supplied with Askarel...Moloney's safe, non-inflammable cooling and insulating liquid.

For over fifty years, Moloney Transformers have been noted for containing that "extra something" that contributes to their longer life and greater dependability. For your next Load Center or Transformer Installation... where continuity of service is of the utmost importance...specify Moloney Transformers.

MES3-28

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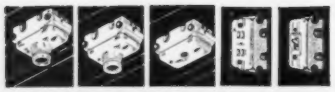

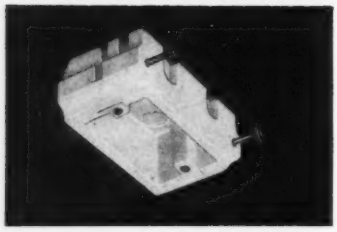

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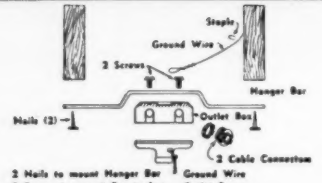
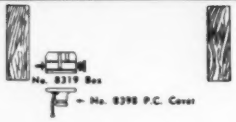
- LESS TIME TO INSTALL.
- A SAFER JOB.

ELIMINATE ALL THIS



11 THINGS, Count 'em, ELEVEN!!

SIMPLIFY TO THIS



1 No. 8319 Box
1 No. 8398 P.C. Receptacle Cover
Nothing Else

NO Hanger Bar
NO Loose Nails
NO Loose Screws
NO Connectors
NO Ground Wires
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These outlets are nail assembled, *ready* to mount. They save money, simplify inventory—and really *make sense!* Non-metallic, made of rugged, durable safe ceramics. See your jobber or write to us.

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FINDLAY, OHIO

PGE REFUSED EXTENSION ON PELTON TAX GRANT

Portland General Electric Co. has been refused a third extension of its rapid tax amortization certificate for the proposed Pelton hydroelectric dam on Oregon's Deschutes River. In a brief announcement of the action, Office of Defense Mobilization explained the denial was made on recommendation of the Department of the Interior.

The certificate originally was granted in January 1952, and would have permitted the utility to write off $14,469,000—or 65%—of estimated cost over a five-year period instead of the normal 20-25 years depreciation period for federal income tax purposes.

PGE has FPC approval of the project but the Oregon state hydroelectric commission has refused to grant a license because fish commission demands are unsatisfied. The case is now before the court in San Francisco.

ODM had previously granted two extensions of the original six-month period during which construction was to begin in order to qualify for the tax grant. Should the legal entanglements involving state commission suit be resolved in favor of PGE the company could reapply. This could only be done, however, if the project were to be delivering energy on the line before December 31, 1955, expiration date of the rapid amortization program adopted at the beginning of Korean hostilities.

Power Company Sponsors Irrigators' Institute

Pumping is a more effective method of lowering a water table than a deep ditch, W. G. Sloan, La Mesa, Calif., consulting engineer and author of the Sloan plan, told farmers attending the fourth annual Idaho Power Co.-sponsored irrigators' institute at Ontario, Ore.

Sloan explained to the farmers that he once favored a deep ditch as a means of drainage, but since its reach is only 300 ft each way from the bank, the ditches require too much right-of-way that otherwise can be left in crop production.

He said the surest and cheapest way is to lower the water table by pumping, then use the lifted water to irrigate new land. Utilization of the water pays for the cost of pumping.

Large-scale irrigation in the Snake River Valley has raised the water table as much as 40 ft a year in some places.

• **Midstate Electric** Cooperative, LaPine, Ore., has received approval of a $56,000 REA loan for construction of headquarters.

BUSINESS OPPORTUNITY FOR MEN WITH ELECTRICAL WHOLESALING EXPERIENCE

FOR SALE Well established 30-year old Electrical Wholesale Supply House located in Mountain States doing $900,000 volume annually with good franchises, showing consistent nice profit. Approximate assets $250,000. Will require approximately $150,000 to handle. Partners getting along in years and want to retire. If interested write in confidence to Box No. 276, Electrical West, 68 Post St., San Francisco 4, Calif.

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"Position with established manufacturers' representative agency in central or northern Rocky Mountain area or Pacific Northwest, or as sales manager for manufacturer with headquarters in same area. Experienced as manufacturer, manufacturer's representative, and national sales manager in transmission and distribution equipment. Protestant, early forties." Write Box 275 — Electrical West, 68 Post St., San Francisco, Calif.

HOW TO test, repair and service all home electrical appliances

This handbook contains all necessary electrical and mechanical fundamentals—with over 700 illustrations—sectional, exploded, operational views—picturing details of appliance construction, operation, and servicing. Explains the WHY and HOW of electrical devices . . . gives advanced methods and technical know-how to solve everyday problems.

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- air conditioners
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- etc., etc.

Begins with basic principles of electrical and mechanical machinery operation. Then it proceeds through home wiring systems, to resistance-heating appliances, motor-driven appliances, and refrigeration and air conditioning appliances . . . covering construction, operation, and servicing of each.

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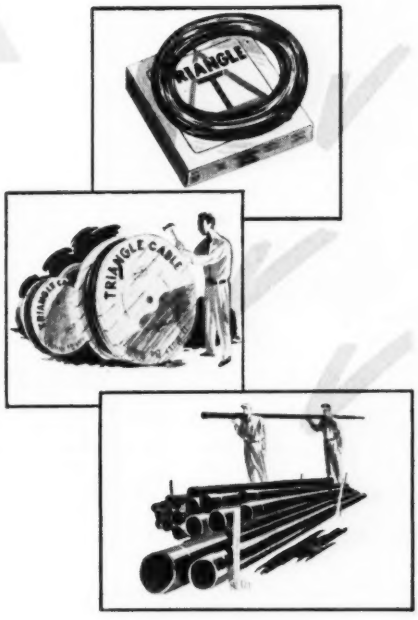

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New KEARNEY Type K and T Made to Meet EEI-NEMA Standards

In cooperation with EEI and NEMA KEARNEY has developed K (fast) and T (slow) fuse links to meet industry-wide, time-current standards . . . *in addition* to giving you such exclusive KEARNEY features as:

1. **True mechanical interchangeability because button terminals are threaded**
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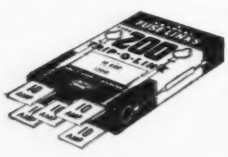
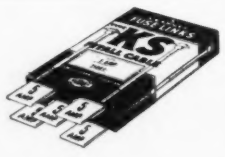
3. **Packages are color-coded (silver for Type T—gold for Type K) to assure fool-proof identification and save time on the job**
4. **Easy-to-use, "pull-out" package**

or Specialized

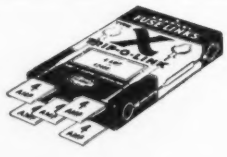
KEARNEY Type 200
Specially made for troublesome circuits that are subject to long-time overloads and surges. Overloads up to 150% can be carried for as long as one hour without damage to fuse link or cutout.



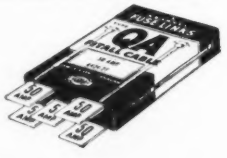
KEARNEY Type KS
Specially designed to protect and still keep outages at a minimum on circuits subject to switching and lightning surges. KS overload capacity is identical with Type 200, but surge capacity is twice as great.



KEARNEY Type X
A specialist at keeping transformers in service during heavy overloads and surges . . . yet clears the fault before damage range is reached. Opens 230% of rated current within five minutes.



KEARNEY Type QA
The QA link is designed to open at a lower percentage of rated current, and therefore will fuse more rapidly than fuse links of the same ampere rating which have been designed to open 230% of rated load within five minutes.



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USBR's Nimbus Dam, 15 miles east of Sacramento on the American River, will serve as an afterbay for regulation of water released from Folsom Dam, 7 miles upstream. Winston-Johnson Co., Monrovia, Calif., is constructing the dam and power plant

Interior Signs Agreement for Alaska Project Purchase

Subject to ratification by voters on Oct. 12, an agreement for sale of Anchorage's Little Eklutna hydroelectric project to the federal government has been signed by representatives of the Department of the Interior and the city. Interior now is building a much larger project on the lake. Under the agreement, the government will furnish the city with power until 1978 at a rate equivalent to that of the city's current cost of power production. The contract calls for abolition of the Anchorage Public Utilities Commission.

CVP Will Serve Power to Moffett Field Lab

Contract to serve the Ames Aeronautical Laboratory at Moffett Field, Calif., with Central Valley power was announced recently by Interior Secretary Douglas McKay.

The contract provides for an initial block of 15,000 kw of firm power, to be increased gradually until Jan. 1, 1957, when 50,000 kw will be supplied. Provisions are also made for an initial sale of 35,000 kw of nonfirm power, to be increased to 210,000 kw. Increases are dependent upon completion of Folsom and Nimbus power plants, now under construction.

Firm power is to be sold at the existing schedule for CVP wholesale power. Nonfirm power will be sold on a capacity charge basis of 25c per kw per month plus a flat rate of 3 mills per kwh used. The power will be supplied over CVP trunk lines and the Pacific Gas and Electric Co. transmission system.

• **Petersburg, Alaska,** will open bids next April for a $750,000 hydro plant, according to R. W. Beck & Associates of Seattle, consulting engineers. The project calls for a rockfill dam 200 ft long and 25½ ft high, with 5,000 ft of 12- to 18-in. steel penstock to the power house, 18 miles of transmission line, a new 250-kva generator and reinstallation of two existing generators.

• **The Public Works** Department of Tacoma, Wash., has included a $2,291,980 request for a new street lighting program in its preliminary 1954 budget. The money approaches a maximum plan for adequate street illumination as proposed by Robert E. Schmidt, former city traffic engineer.

• **Survey crews** are working on the new $2,500,000 Buttle Lake power project of the B. C. Power Commission on Vancouver Island. The commission is planning to start construction this fall and complete the dam next year. Controversy over the project has been in progress for over two years. It will supplement power to the John Hard development.

KERITE CABLE-GRAM

From a message received from Samuel F. B. Morse in 1868:

"I HAVE BEEN MUCH GRATIFIED IN EXAMINING YOUR COMPOUND CALLED KERITE IN ITS APPLICATION SPECIALLY TO TELEGRAPHIC CONDUCTORS, AS AN INSULATOR, WHETHER IN THE ATMOSPHERE, THE EARTH OR BENEATH THE WATER. IT APPEARS TO ME YOU HAVE DISCOVERED THE MOST PERFECT OF ALL INSULATING SUBSTANCES FOR SUBMARINE TELEGRAPH CABLES. IN COMMENDING KERITE SPECIALLY FOR TELEGRAPHIC PURPOSES I WOULD BY NO MEANS LEAVE OUT OF VIEW ITS OTHER VARIOUS APPLICATIONS IN THE ARTS NO LESS EXTENSIVE AND USEFUL."

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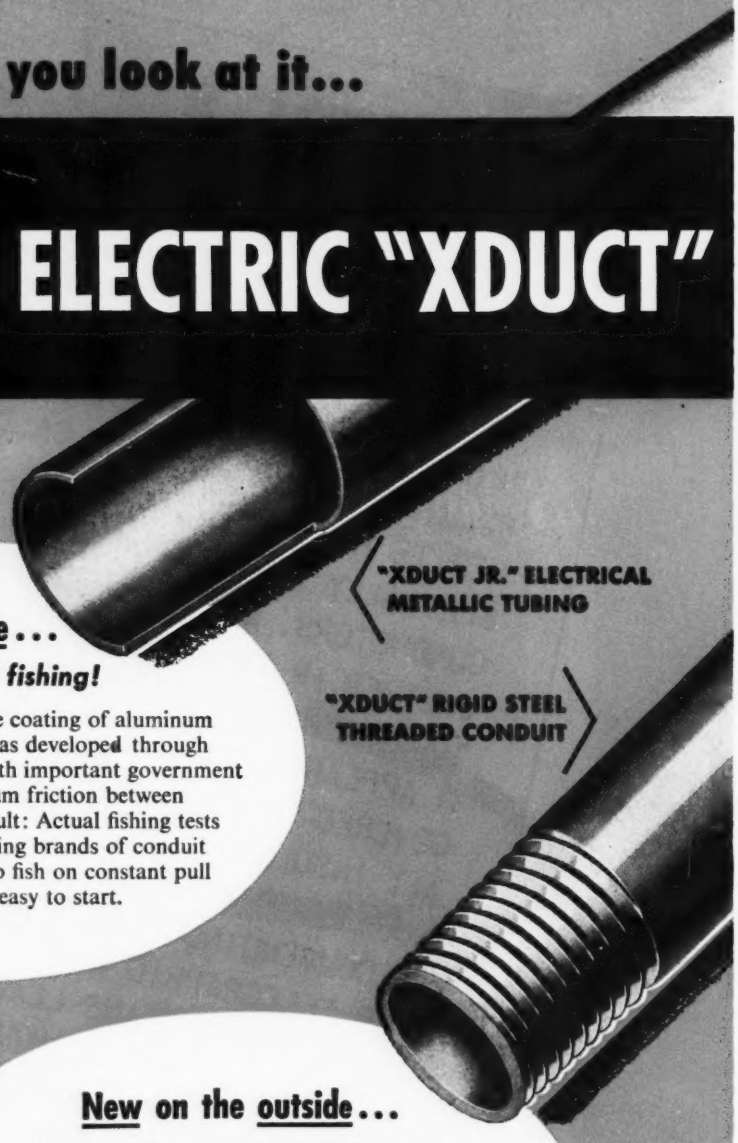
No matter how you look at it...

NATIONAL ELECTRIC "XDUCT"



New on the inside...

for easy, easy fishing!

"Xduct's" new baked-on inside coating of aluminum enamel (patent applied for) was developed through intensive research in connection with important government projects. It provides minimum friction between conduit wall and wires. The result: Actual fishing tests conducted with five other leading brands of conduit prove "Xduct" is 66% easier to fish on constant pull —more than twice as easy to start.

New on the outside...

for superior corrosion resistance!

National Electric's revolutionary new patented electrogalvanizing process electrolytically deposits pure zinc *uniformly* over the entire outside surface of "Xduct" conduit, including the threads. The result: a protective coating that adheres positively to the basic steel . . . possesses superior corrosion resisting qualities.

CONDUITS are NEW!

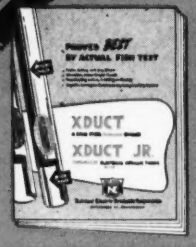
Plus these new features:

1. Positive Thread Protection
Sharp, clean threads of "Xduct" rigid steel conduit are machined before galvanizing to assure complete protection from end to end. The result: every hill and valley of threads are completely galvanized.

2. Superior Bending Qualities
High-ductile steel is used to assure easy bending.

3. Attractive Color
"Xduct's" silvery color is highly acceptable for installation in exposed locations.

Fishing is easy with "Xduct" Conduit— Proved best by actual fish test!



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PARANITE HYDRO-THERM
BUILDING WIRE

● Paranite Hydro-Therm combines in a single wire the heat-resistant qualities of Type RH and the moisture-resistant qualities of Type RW.

USED IN DRY LOCATIONS Paranite Hydro-Therm carries more current per dollar of cost. The higher amperage rating for Type RH wire under the National Electrical Code provides greater current carrying capacity. You can use smaller conductors, smaller sizes of conduit; and lower your labor costs.

USED IN WET LOCATIONS Paranite Hydro-Therm is rated as Type RW wire for 60°C operation because of its excellent moisture-resistant qualities.

IF IT'S **PARANITE** IT'S RIGHT!

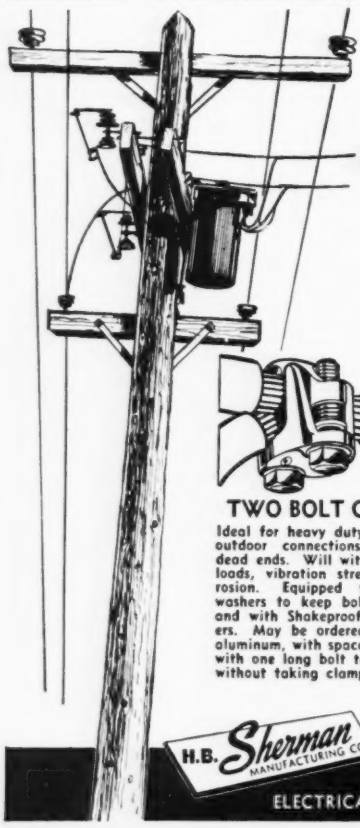
DISTRIBUTED THROUGH WHOLESALERS

PARANITE WIRE AND CABLE
Division of ESSEX WIRE CORPORATION
FORT WAYNE 6, INDIANA

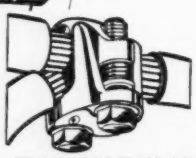
WIRES AND CABLES SINCE 1890

ELECTRICAL WIRES AND CABLES *"BETTER THAN CODE REQUIRES"*

WAREHOUSES* AND SALES OFFICES: *Atlanta, Ga.; *Boston, Mass.; *Chicago, Illinois; Cleveland, Ohio; Dallas, Texas; Detroit, Michigan, Indianapolis, Indiana; *Kansas City, Mo.; *Los Angeles, Calif.; *Newark, N.J.; *Portland, Oregon, Upper Darby, Philadelphia, Pa.; *Saint Louis, Missouri, *San Diego, California; *San Francisco, California



USE
***Sherman*®**
Connectors
For
Economical Quality



TWO BOLT CLAMPS
Ideal for heavy duty indoor and outdoor connections, taps and dead ends. Will withstand overloads, vibration stress and corrosion. Equipped with rubber washers to keep bolts in place, and with Shakeproof lock washers. May be ordered plated for aluminum, with spacer washer, or with one long bolt to permit use without taking clamp apart.

JUMPER CLAMPS
Unique construction eliminates need of removing bolt to install. Three styles for aluminum to aluminum, aluminum to copper, and copper to copper.

SPLIT BOLT CONNECTORS
Extra strength and die-cut threads permit re-use. Three styles available in many sizes.

WRITE FOR CATALOG

H.B. Sherman MANUFACTURING CO.
BATTLE CREEK, MICHIGAN
ELECTRICAL FITTINGS FOR WIRE AND CABLE

POSITIONS RECLASSIFIED BY CIVIL SERVICE

The positions of executive secretary of the Bonneville Power Administration and secretary to the administrator are among those that have been reclassified by the U. S. Civil Service Commission and are being reviewed for exclusion from civil service tenure because they fall into policy-making category.

These are in addition to the four top BPA jobs appointive under the Bonneville act and automatically subject to change at the desire of the Secretary of the Interior. The four include administrator, assistant administrator, chief engineer and general counsel.

Personnel in these posts at present are: Administrator Paul J. Raver, who has held the post since September 1939; Assistant Administrator John D. Davis, who moved into the job in June 1952 from the Washington, D. C., office managership; Chief Engineer Sol E. Schultz, who has been with Bonneville since September 1939; General Counsel Norman A. Stoll, assigned June 1948. The executive secretary is Harry M. Kenin, with BPA since September 1942; the secretary to Dr. Raver is Inza M. McDowell, on the job since March 1938.

• **Establishment** of a new federal agency to coordinate national water resources development was advocated by California State Engineer A. D. Edmonston recently in a speech before the annual convention of the Western State Engineers Assn. in Reno. National trend toward the assumption by states and local agencies of a larger share in the initiation, planning, construction and operation of these projects was noted by Edmonston, who also pointed to a belief that these agencies, to the extent of their abilities, should assume a larger share of the costs of such projects.

• **Columbia Basin Commission** expects Congressional consideration in January of a plan to expand Chief Joseph project to include irrigation. Four states—Washington, Idaho, Montana and Wyoming—have reported favorably on the Foster Creek unit, which would irrigate 7,000 acres, according to Hubert Walter, executive secretary of the CBC.

• **Chelan PUD's** six new generators in Puget Sound Power & Light Co.'s Rock Island Dam on the Columbia River near Wenatchee, Wash., earned a net income of $238,622 from Sept. 4, when the first unit went into operation, through the first half of this year, PUD officials have announced.

It pays to specify *Kuhlman* standard transformers

As every user of transformers knows, such apparatus equipped with special accessories or special electrical characteristics usually costs a great deal more than standardized units. But Kuhlman Transformers, built to EEI, ASA, and NEMA Standards, save you money and can be delivered faster because they are made according to a standardized design and equipped with standard parts that reduce engineering and production time.

These national standards include KVA ratings, dimensions and locations of standard accessory equipment, sizes and locations of terminals, nameplate data, connection diagrams and dimensions for standard auxiliary devices. Today Kuhlman Transformers not only meet these standards, but provide extra factors of efficiency, safety and reliability.

Kuhlman Transformers are soundly engineered and sturdily constructed for years of exceptional service. Kuhlman makes Power, Distribution, Dry Type, Saf-T-Kuhl, Subway, Series, and CSP in standard ratings for virtually every electrical application. Write us today for complete information.

Typical power transformer per ASA Standards. | Typical overhead distribution transformer per EEI-NEMA Standards. | Typical subway type transformer per EEI-NEMA Standards.

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CRYSTAL SPRINGS, MISSISSIPPI

KUHLMAN K E ELECTRIC

EXPORT REPRESENTATIVE: *International Standard Electric Corporation*
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KEEP YOUR POWER LOAD UP
...YOUR OUTAGES DOWN!

String Copperweld TRADE MARK

OVERHEAD GROUND WIRES

—and get PERMANENT PROTECTION for your Transmission Lines

Every year an average of 70,000 strokes of lightning hit power lines in this country, causing 10 times as many transmission outages as any other single factor. As a practical, economical solution to this serious problem, many power systems are using Copperweld* Overhead Ground Wires on their transmission lines to be sure of safe, low-cost and permanent protection against lightning damage.

Copperweld's thick copper covering, inseparably molten welded to the strong steel core of each wire, affords excellent electrical conductivity for relaying and for dissipating lightning discharges. And because this copper covering is rust resistant, the high strength of each wire remains permanent. Thus, with Copperweld Overhead Ground Wires, you can string with small sags to maintain ample mid-span clearances—even under the most severe weather conditions.

Plan now to shield your transmission lines with Copperweld Overhead Ground Wires. You'll find there's no better way to reduce lightning losses, keep upkeep down and be assured of constant uninterrupted service. Write today for your copy of the Copperweld Engineering Data Book—there's no obligation.

*Trade Mark

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Copperweld TRADE MARK

NON-RUSTING

OVERHEAD GROUND WIRES

Last The Life Of The Conductors They Protect!

BRITONS CAN HAVE PROSPERITY —If They Want It

What is required to get Britain, our key ally in the grand alliance of the free world, firmly back on her economic feet? The purpose of this message is to throw light on this crucial problem, which afflicts our other European allies also.

At the moment, Britain is enjoying a respite from the economic crises (of 1947, 1949 and 1951-52) which have plagued her postwar course. This respite may well continue for some time. But almost no one whose judgment is trustworthy believes that Britain has acquired sufficient economic strength to safeguard her against further economic crises in the years immediately ahead.

Two British Views

New and clear light on what should be done to that end has recently been shed by two noteworthy British publications. One is a book, "We Too Can Prosper," by Graham Hutton, distinguished British economic writer and administrator. The other is an article, "The Riddle of Prosperity," published by THE (London) ECONOMIST, Europe's most eminent economic journal.

Combined, these two publications present in sharp relief the basic problem that must be handled successfully if Britain is to be safely solvent. As is implied by its title, ***the Hutton book demonstrates that Britain can be made prosperous by readily feasible procedures, patterned on what has been done in the United States, to increase its industrial efficiency. But, says THE ECONOMIST, with Mr. Hutton's book in mind, this is not the most basic problem, which is, "How shall we make the British people determined to be prosperous?"*** This is a problem of incentive or motivation.

Compared with that of the United States, average industrial efficiency in Britain, as in most of Western Europe, is low. In his book Mr. Hutton remarks that "fifty years ago an American industrial worker turned out roughly the same amount in a day as his opposite number in Britain, Germany or France. . . . Today, he turns out from two to five times as much."

In large part it is this lag in output per hour or "productivity," as the technicians call it, which makes Britain and other key countries in Western Europe a continuing prey to economic crises. Moreover, the great disparity in productivity between the U.S.A. and most

of Western Europe is a major barrier to knitting the free world into a smoothly working economic whole. As one observer put it, "when the American economy catches a cold, the European economy gets pneumonia." This is largely because Europe is so much weaker in productive strength.

No Shortage of Knowledge

Yet the knowledge which would enable the countries of Western Europe, and particularly Britain, to increase their industrial productivity has been mobilized and is readily available to them. It is with this process for Britain that Mr. Hutton's book is concerned. In the book he summarizes the findings and conclusions, virtually all of them unanimous, of 66 teams, composed of British industrial managers, technicians, shop workers and labor leaders. Over a period of three years these teams completed a comprehensive series of inspection and study trips in the United States under the sponsorship of the Anglo-American Council on Productivity. The product of that effort, he remarks, is "a set of documents the like of which, on such a scale and of such practical value, has never been seen in the history of international and cultural borrowing."

Psychology the Key

From study of these documents, Mr. Hutton concludes that better capital equipment is the key technical ingredient of higher industrial productivity in Britain, and constitutes "the most urgent . . . need of British industry." But he finds that ***even without new capital equipment a "15% rise in productivity can still be achieved by reorganization of work," and that such an increase would "solve Britain's chief social and economic problems."***

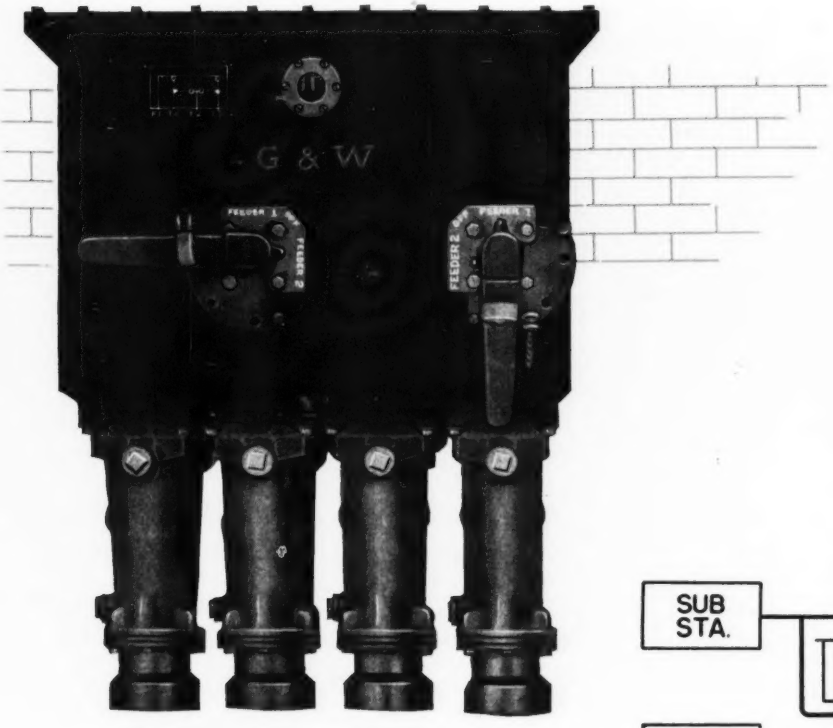
Then why is not such an increase in productivity, demonstrated by the Anglo-American productivity teams to be so clearly within technical grasp, promptly forthcoming? Mr. Hutton, quoting one of the team reports, remarks that, ***"'the greatest obstacles to increased productivity are psychological rather than technical.'*** We have to deal first and foremost with men, not machines." And THE ECONOMIST, pursuing the line of inquiry suggested, reaches the conclusion that, by and large, the people of Britain do not want to prosper by being more efficient. THE ECONOMIST says:

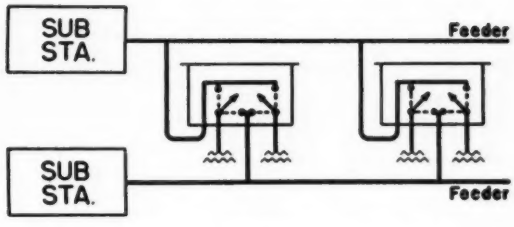
> "The real secret of American productivity is that American society is imbued through and through with the desirability, the rightness, the morality of production. . . . But in Britain, if any moral feeling at all survives about economic matters, it is usually a vague suspicion that economic success is reprehensible and unworthy. From this difference in attitudes everything else follows."

"How," asks THE ECONOMIST, "shall we set about restoring some belief in the rightness of effort, the morality of success?" For this question it has no ready answer. Neither have we. We are confident that the British people will neither be cajoled nor coerced into trying to match our productivity. Basically the problem seems to be to demonstrate clearly to them the truth of the proposition, set down by Graham Hutton, that "there is no goal, aim or end before a Good Society which the raising of that society's material productivity cannot render easier of achievement." Doing that in an old and settled country like Britain is obviously an extremely formidable undertaking. But ***until it is done, the crucial job of getting Britain and the rest of Western Europe firmly on its economic feet will remain to torment all of us.***

McGraw-Hill Publishing Company, Inc.

AVOID SHUTDOWNS BY TRANSFERRING LOADS WITH G & W LOAD BREAK OIL SWITCHES





"RAJ" OIL SWITCHES

The Type "RAJ" is a 4-way load break* oil switch with busses and two sets of links for interconnection of two feeds and two load circuits.

Lengthy shutdowns are avoided by transferring loads to an alternate feeder when the primary power supply fails. Each load can be supplied separately or both can be connected together to either feeder.

"RAJ" switches are housed in a heavy, completely sealed, welded steel tank suitable for installation in subway, overhead, or exposed locations. Standard ratings are 7500, 15,000 and 23,000 volts with a continuous current carrying capacity of 400 amperes.

***Non-load break switches also furnished for ASKAREL filling.**

Send for Bulletin AB51, which gives complete data and prices.

G & W Bulletin H-48 shows system layouts for "Primary Cable System Flexibility". Send for your copy, there is no obligation.

G & W ELECTRIC SPECIALTY CO.
7780 Dante Avenue, Chicago 19, Ill.
Cable Terminating, Connecting and Sectionalizing Devices
Representatives in principal cities of U. S. A.
In Canada—Powerlite Devices Ltd. Toronto and Montreal

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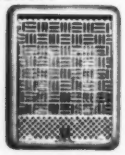
Modern Automatic heating at its finest..

- Offer your dealers these outstanding products ... outstanding because their consumer acceptance has been rapid and sales have jumped by leaps-and-bounds.



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Nu-air
thermostatic-controlled automatic wall furnaces in 5 sizes to meet every requirement.

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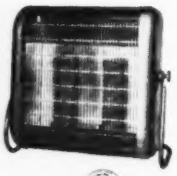
thermostatic-controlled automatic portable floor furnaces permit you to direct heat where it is needed.



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Famed for Dependability Throughout the World

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Please send me additional information on the Meier Nu-Air portable and wall-type automatic wall furnaces, and the availability of franchises in my trading area.

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NEWS ABOUT PEOPLE

D. C. McGraw Heads Publishing Company

Donald C. McGraw was elected president of McGraw-Hill Publishing Co. Inc. by its board of directors in New York. He succeeds his brother, Curtis W. McGraw, who died on Sept. 10.

Youngest son of the late James H. McGraw Sr., founder, Donald McGraw has been associated with the company since 1919. He has been a director since 1935 and vice-president since 1945. During World War II, he was a consultant to the publishing and printing division of the War Production Board. He served with the U. S. Navy during World War I.

He joined McGraw-Hill as a member of the advertising staff of *Chemical and Metallurgical Engineering*, now *Chemical Engineering*. Two years later, he transferred to the press room and composing room. In 1924 he assumed supervision of the operation of the McGraw-Hill building at 36th St. and Tenth Ave. and of the company's printing plant.

Since 1933, when he was made secretary of the company and put in charge of production and manufacturing, he has been responsible for the handling of all contracts for printing and binding, engraving and paper supply for the entire McGraw-Hill operation.

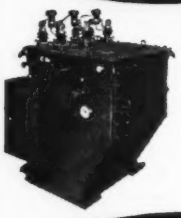
In 1945 he was named vice-president for manufacturing and general services, the position he held until he was elected president. In 1950 he became a director of the McGraw-Hill Book Co., a McGraw-Hill subsidiary, and of the Newton Falls Paper Mill, in which McGraw-Hill has a half interest.

• **Verne Scoggins,** a newspaperman, has been appointed a member of the California Public Utilities Commission. Scoggins was named by Gov. Earl Warren to succeed **Harold P. Huls** of Pasadena. Huls resigned to take a governor's appointment as a superior court judge in Los Angeles County. Former political editor of the Stockton, Calif., Record, he has been a secretary and public relations adviser to Warren since Warren took office as governor in 1942.

• **J. F. Cooper,** Idaho Power Co. district manager at Ontario since 1931, will retire in November. He will be succeeded by **Lewis Bean,** former manager at Homedale.

McGraw

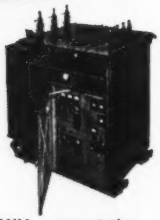
Pennsylvania
TRANSFORMER CO.
INTRODUCES
ITS NEW LINE OF
STEP VOLTAGE REGULATORS



20.8 Kva, 2400 Volts through 750 Kva, 13,800 Volts

UNIT SUBSTATIONS

1000 Kva through 3000 Kva, 12,000 Volts through 34,500 Volts Primary



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J. G. CORRIN
600 S. Highland Avenue, Los Angeles
VAndike 5533
GEO E. HONN CO.
420 Market Street, San Francisco
SUtter 1-7352

Columbia TW is sturdy, dependable, easy-to-pull, easy-to-strip. It is made to conform to exacting quality controls, rigidly tested for long life.

It assures quick, easy, economical installations. Wherever the job calls for the finest thermoplastic wire, specify Columbia TW.

And, Columbia gives you the service that keeps your jobs "on schedule".

ALL SIZES — ALL COLORS

Approved by Underwriters' Laboratories

COLUMBIA CABLE & ELECTRIC CORP.

Serving the Electrical Wholesaler Since 1912

255 Chestnut St. **Brooklyn 8, N. Y.**

Sales Representatives

DALLAS—Olsen-Robertson Co., 2104 Irving Blvd.
HOUSTON—Olsen-Robertson Co., 2216 Walker St.
LOS ANGELES—Frank H. Bran Co., 607 E. 6th St.
SAN FRANCISCO—Robert R. Prussia Co., 224-26 Harriet St.
PORTLAND—The Sanderlin Co., 201 S. E. Washington
SEATTLE—The Sanderlin Co., 129 First Ave., West
DENVER—Kenneth B. Schumann Co., 1073 Galapago St.

Electrically, the Western States are this big—

Eleven Western States	1940	1953	% Increase
Kw generating capacity (total)	6,349,095	14,681,701	131%
Kwh generated (millions)	24,410	78,068	220%
Utility construction	$140,275,000	$765,000,000	373%
Kw of capacity added	361,210	1,686,884	367%

There are many new people to sell—

Number of electric customers	3,986,361	7,019,896	76%
Pacific Gas and Electric Co. employees	12,544	19,025	52%
Southern California Edison Co. employees	4,616	7,352	59%
Sacramento Municipal Utility District employees	2	561	!
Arizona Public Service Co. employees	873	2,006	130%
Pacific Power & Light Co. employees	785	1,303	64%
Pacific Coast Electrical Assn. membership	2,782	4,728	69%

And one best way to reach them—

Electrical West			
paid subscribers	5,889	10,300	78%
number of advertisers	98	272	170%
pages of advertising	502	1,200	140%
pages of editorial	687	956	39%

Here's how they'll grow in 1954 and 1955—

	1954	1955
Kw of new capacity (planned)	2,265,314	2,216,950
Miles transmission line (est.)	5,645	5,510
Miles distribution line (est.)	8,025	7,800
Kva-substations (est.)	8,375,000	8,170,000
New customers (est.)	250,000	250,000

That's why Electrical West should be on electrical equipment advertising schedules

Electrical West has served the entire electrical industry in the 11 Western States for 67 years. Reaches utilities, contractors, wholesalers and other buying influences.

Representatives

WALTER KLEIN—New York
M. I. O'CONNELL—Chicago
CARL DYSINGER—Los Angeles
R. C. ALCORN—San Francisco

ELECTRICAL WEST

ABP A McGraw-Hill Publication ABC

• **Robert H. Gerdes,** vice-president and general counsel of Pacific Gas and Electric Co., has been elected to the utility's board of directors. He replaces **W. G. B. Euler,** who submitted his resignation in anticipation of his retirement later this year. Gerdes has been with the company 16 years. Euler is executive vice-president of the company, having served with PG and E and its predecessor companies for 43 years.

• **Lewis M. Shreve,** who has been with the electrical industry since 1909, retired recently. He started with Wenatchee Electric Co., a predecessor of Puget Sound Power & Light Co. and, after holding various positions, in 1930 he became manager of Puget's eastern division at Wenatchee, Wash. In 1948 the eastern division properties were acquired by Public Utility District No. 1 of Chelan County and Shreve was retained as consultant to the district commissioners.

• **Guy W. Thomas** has been appointed general commercial manager of Public Service Co. of Colorado to succeed the late Gaylord B. Buck. He began working for the company in 1919 as junior engineer in Denver and spent several years as new business and power sales representative in various divisions. Since 1927 he has been in Denver as power sales engineer, power sales supervisor and manager of the Denver commercial department.

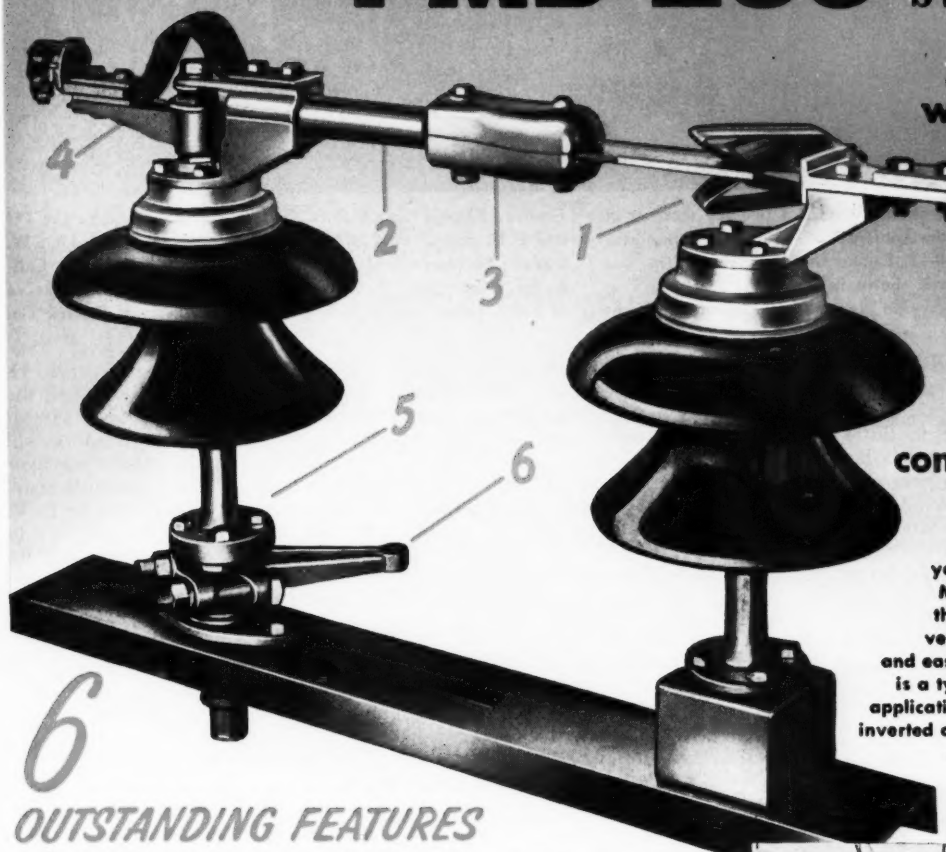
• **Paul A. Yetter,** new manager of division operations for Public Service of Colorado, has been transferred to the general office in Denver from Grand Junction, where he had been division manager since 1947. **Charles E. Beatty,** division manager in Leadville, will succeed him at Grand Junction, while **Eugene Leuthi** will go from Brush to Leadville.

• **Robert T. Person** has been named manager of advertising and publicity for Public Service Co. of Colorado. He had been vice-president and general manager of the Pueblo Gas & Fuel Co., a subsidiary.

• **Gilbert Sherman,** electronics engineer from Los Angeles, was appointed electronics sales representative for Westinghouse in the Pacific Coast district by Walter J. Maytham, regional manager. He succeeds **Robert F. Roberts,** who was appointed manager of the equipment tube sales at Elmira, N. Y.

• **William A. Gussow,** at one time with Cole Electric Co. of Culver City, Calif., has joined S&C Electric Co. of Chicago as a design engineer.

DELTA-STAR'S time-tested, single side-break PMB-236 SWITCHES



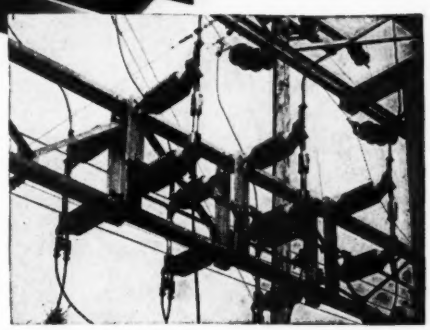
where cost and space are considerations

these switches give you the most for your dollar investment. Many engineers prefer this type because of its versatility, compactness and ease of operation. There is a type for every outdoor application—whether upright, inverted or vertically mounted.

6 OUTSTANDING FEATURES

1. Multi-finger, high pressure, silver inlaid button type contacts.
2. Heavy copper tubular blade with knee-break contact section of hard drawn copper.
3. Fully enclosed knee-break blade mechanism.
4. Rotating terminal. Free swinging terminal at hinge relieves strain on cable as insulator rotates.
5. Greaseless non-rusting type ball bearings insure free operation. Radial and thrust loads are fully supported.
6. Threadless adjustable operating mechanism parts with self-piercing set screws eliminate drifting once final adjustment is made.

Available in all standard ratings: 7.5 to 161 KV inclusive; 400, 600 and 1200 amperes.



WHEN YOU WANT THE BEST IN HIGH VOLTAGE SWITCHING EQUIPMENT SPECIFY DELTA-STAR

DELTA-STAR ELECTRIC DIVISION

H. K. PORTER COMPANY, INC.
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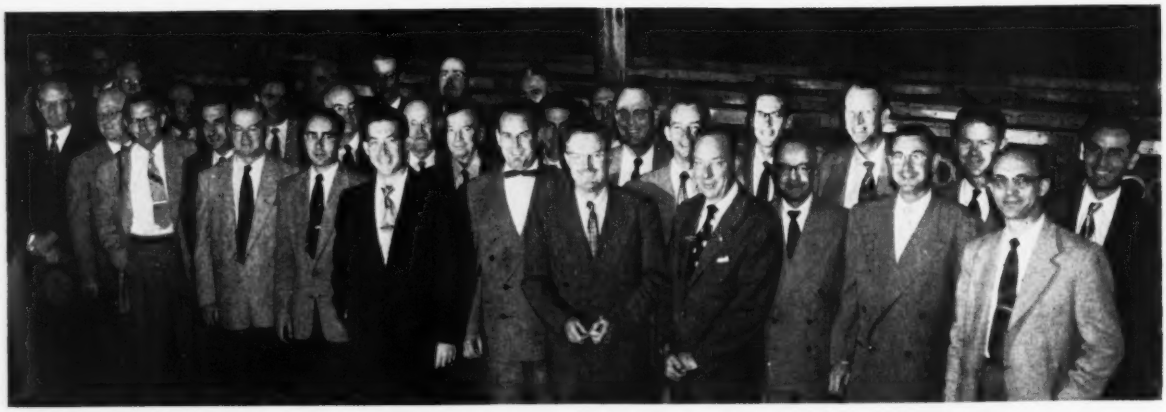
DISTRICT OFFICES IN PRINCIPAL CITIES



Thirty members from 13 utilities attended a two-day meeting of the California Inter-Utilities Underground Standards Committee in San Francisco, Sept. 10-11. Pacific Gas and Electric Co. was host to the group, which is shown here during a field trip to Soapstone Duct Co.'s Emeryville plant. Trips were made also to Gardner Electric Co., Magna Engineering Corp. and to the PG and E bureau of tests and inspection. Speakers included C. W. Callow, Sacramento MUD; R. C. Blankenburg, Southern California Edison Co.; J. R. Kelley, Los Angeles Department of Water & Power; and J. B. Brown, San Diego Gas & Electric Co.

• **H. E. Chambliss,** Great Falls division manager for Montana Power Co., has been appointed chief engineer with headquarters in Butte. He succeeds **A. B. Martin** who has resigned to accept a position with the Washington Water Power Co. **Dix C. Shevalier,** division superintendent at Great Falls, has been promoted to division manager. He will be succeeded by **Herold Murdock,** Bozeman-Livingston division superintendent, who will be transferred to Great Falls. **David Johns** has been promoted to division superintendent for the Livingston-Bozeman division of the company. Johns has been working as an electrical engineer in Great Falls.

• **J. Hyde Stayner,** meter department superintendent for Utah Power & Light Co., has added to his responsibilities that of heading the appliance repair and fixit shop since the retirement of **John H. Olson. Dave Rich** is foreman of the repair shop.

• **Homer C. Bender,** who retired from adequate wiring sales for Washington Water Power Co., is now merchandising analyst for radio station KNEW, a Mutual station, in Spokane.

• **James B. Black Jr.** has been made manager of sales in Denver for U. S. Steel's Columbia-Geneva Steel Division. The new sales district combines the areas formerly served by the Denver and Salt Lake City offices into one operation.

• **Hugh C. Cate,** for 20 years with the Los Angeles Department of Water & Power as power salesman, line extension supervisor, and in other posts, was promoted to the position of new construction sales manager. He is in charge of adequate wiring promotion in conjunction with the Los Angeles Electric League, line extensions and other residential new construction promotion.

• **Willard C. Johnson,** industrial sales supervisor for Westinghouse at San Francisco, retired recently after 42 years with that organization. All but one of those years were spent in California.

• **A. J. Orselli** has been named a vice-president of Bechtel Corp. and assigned to the firm's power division. He will act as assistant to J. P. Yates, senior vice-president. Until recently Orselli was manager of construction of the firm's eastern division.

• **Willis L. Winter** is new distribution apparatus manager for Westinghouse Electric Corp.'s Pacific Coast District. He formerly served as assistant to the manager of the district's electric utility department. A University of California graduate, he joined Westinghouse at East Pittsburgh in 1916. After serving in World War I, he was assigned to the San Francisco office, where he has remained except for the period from 1933 to 1942, when he was in Salt Lake City.

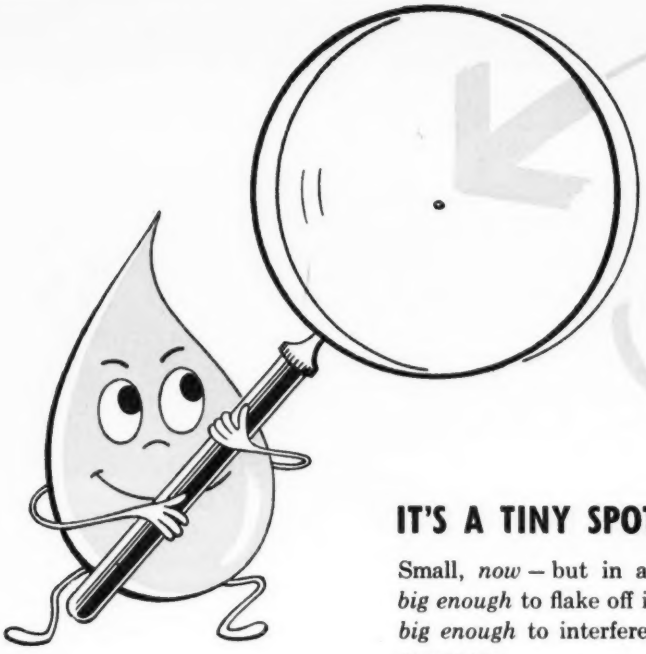
• **District** administration changes in the Southern California Edison Co., coincident with the recent retirement of **H. A. Brody** and **Paul V. Moffat,** long-time district managers, have been announced by G. N. Hawley, vice-president. Brody, district manager at Huntington Park, and Moffat, district manager at Montebello, will retire with 39 and 37 years of service respectively. **J. S. Meserve,** district manager at San Bernardino, will succeed Brody at Huntington Park. **D. K. Grandey,** presently head of the Vernon district, will succeed Moffat at Montebello. Other transfers will move **W. K. Dunkle,** present manager of the Ontario district to San Bernardino, succeeding Meserve, and **F. V. Vestal,** San Fernando manager, to Ontario. **D. M. Smith,** Alhambra industrial sales supervisor, has been named San Fernando district manager, **and W. E. Weaver,** industrial engineer at the company's Los Angeles office, will succeed Grandey as Vernon district manager.

Deaths

• **E. Clinton Jansen,** 74, chief hydraulic engineer for the Public Service Co. of Colorado at his retirement in 1946, died Sept. 1 at his Denver residence after a long illness. Born Nov. 28, 1878, in Shanghai, he lived several years in England before coming to Denver in 1913. He joined Public Service at that time and served with the firm until his retirement in 1946 because of ill health.

• **George William Westcott,** 68, distribution engineer for Utah Power & Light Co., died of a heart ailment Sept. 11 in Salt Lake City. He had been with the company since 1934, having had prior employment with Electric Bond & Share for 21 years as a consulting engineer.

• **Samuel Kahn,** some years ago vice-president and general manager of Western States Gas & Electric Co. in Stockton and later executive vice-president of Market Street Railway, died in Hillsborough, aged 70, Sept. 10. He was also a director of Wesix National Co.



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NOTES ON THE TRADE

• **Great Falls** copper wire and rod plant of the Anaconda Copper Mining Co. is to be enlarged to include a new aluminum rod and wire mill. Aluminum ingots produced at the Columbia Falls plant of the Anaconda Aluminum Co. will be processed into rod and wire at the new mill. The $50,000,000 Anaconda Aluminum plant at Columbia Falls now is under construction and will use power from Hungry Horse Dam nearby.

• **Prescolite Mfg.** Corp. of Berkeley, Calif., has established an eastern plant and sales division at Neshaminy, Pa. About 50 will be employed by the initial operation. **Preston A. Jones,** who with his partner, **Wallace D. Runswick,** founded Prescolite in 1944, will divide his time between the California and Pennsylvania operations. **William B. Epling,** former plant superintendent at Berkeley, has moved to Neshaminy as resident general manager.

• **Graybar** has opened an office at 655 S. H St. in San Bernardino, Calif., with **J. H. Gregerson** as manager and **R. P. Sager** as operating manager.

• **Westinghouse Electric's** Pacific Coast manufacturing plant at Sunnyvale was awarded top honors for safety by the Santa Clara County Chapter, National Safety Council.

• **Pittsburg Works** of U. S. Steel's Columbia-Geneva Steel Division won the National Safety Council's Award of Honor for its 1952 performance.

• **Line Material** Co. has appointed Harold T. Zamzow as apparatus manager and apparatus engineer for its West Coast division, with headquarters at 101 Williams St., San Francisco. Zamzow has been with the company for six years; was apparatus manager in the Mountain States division and more recently manager of capacitor and regulator sales.

Zamzow

• **Coinciding** with General Electric Co.'s 75th anniversary in October, its board of directors will make its first official group visit to the West Coast. The tour will include inspection of the Hanford Atomic Works and meetings in Seattle, San Francisco and Los Angeles. G-E President Ralph J. Cordiner, one of the two company members of the board, is a native of Walla Walla, Wash., and started his career on the West Coast.

• **Maydwell & Hartzell Sales & Engineering** Inc., Arizona subsidiary of the San Francisco firm of engineers and factory distributors, has set up a district sales office and warehouse at 324 S. Second Ave., Phoenix.

• **United States Rubber** Co. has opened its new Denver branch at 4800 Colorado Blvd.

Tri-State Supply has completed a two-story addition at 544 S. San Pedro St. in Los Angeles. Facilities include complete air conditioning, electrical bookkeeping and intercommunication systems, parking space, a large demonstration and meeting room. The new building, a reinforced concrete, brick and structural steel structure, is adjacent to Tri-State's existing warehouse; gives the firm an additional 6,800 sq ft of space

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All good types— in a complete range of sizes.
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Multifit, numerous clamp types, bolted, yoke-and-nut tees, etc.
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Meter cabinets, bus supports, motor lead connectors, cable taps, fuse clips, etc.
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Sweeney

• **J. I. Sweeney** has been appointed Los Angeles district sales manager of the Locke Department of General Electric Co. Sweeney's previous assignments were at Baltimore headquarters, in Kansas City and Minneapolis. He recently returned to Locke after two years in the Navy. He is opening a new office at 9507 Santa Monica Blvd., Suite 201, Beverly Hills, Calif.

• **General Electric Supply** Co. has opened a warehouse in Stockton, Calif. Manager of the operation will be **G. A. Lobenberg,** who has been with the company since 1925 and has served in Stockton since 1934 as sales representative for the company. His staff will include **Ralph Mitchell,** who will handle small appliances, radio and television; **E. V. Holmes,** who will be supply and apparatus representative; **Howard Marriott,** service manager.

• **William J. Spillman** has been appointed field sales representative for western California and Arizona by Miller Electric Mfg. Co. of Appleton, Wis., maker of welding equipment.

• **Waage Electric** Inc., manufacturer of industrial electric heating devices, announces appointment of Paul H. Potter Associates, 801 N. Lake Ave., Pasadena, as sales representative.

• **Herman E. Held,** San Francisco, has been appointed northern California representative for Atkomatic Valve Co., of Indianapolis, manufacturer of electrically operated valves.

• **General Electric** Co. has appointed Northern Commercial Co. as agent and distributor of its apparatus products in Alaska.

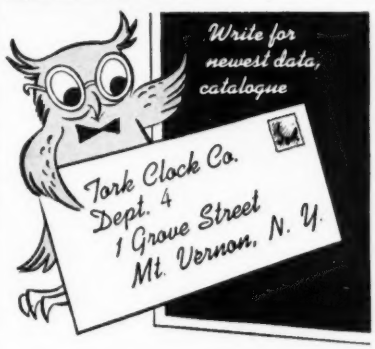
Dietz

• **Harry N. Dietz** has been made Pacific Northwest district sales manager for Orangeburg Mfg. Co. Inc., makers of underground conduit and pipe. He will make his headquarters in San Francisco, as will **Martin Noack,** Pacific Southwest district sales manager. The company's new plant is nearing completion at Newark, Calif.

• **John Oster** Co. has established a new factory service branch in the building erected for it at 855 Stevenson St. between the Furniture Mart and Mission St., San Francisco. The branch has been in San Francisco 13 years at 277 Eddy St., but the new place with new floors, a model kitchen, ample repair department and sales offices affords **LeRoy Herbert,** manager in charge of the California territory and factory representative, the space needed for the expanding Oster business in Osterizers, knife sharpeners, portable mixers, massage instruments, hair dryers, etc. The model kitchen will be used for training of demonstrators and dealer personnel as well as for meetings of housewives, clubs.

• **Frank W. Walker** has been promoted to regional sales manager of Motorola Communications and Electronics Inc., to head a newly created sales region composed of southern California, Arizona and southeastern Nevada with offices in Los Angeles. He will direct sales and service of mobile, two-way radio, microwave, power line carrier and supervisory control systems.

• **Universal Winding** Co., Providence, R. I., will exhibit coil winding machinery to West Coast manufacturers in the Biltmore Hotel, Los Angeles, Oct. 19-28. Five late developments will be shown, according to E. G. Paules, Western representative.



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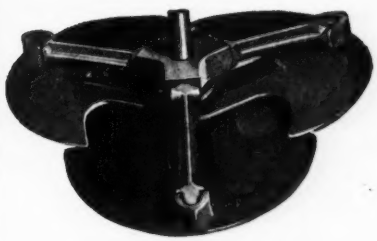

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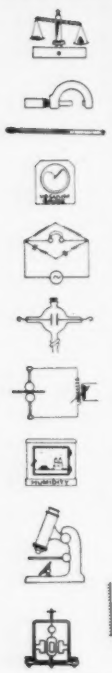
Getting to the bottom of things



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Supplementing this automatic vigilance is a completely equipped quality-control organization which functions at every process-stage from incoming inspection to final testing. At points where statistical control is applicable, our inspectors utilize techniques which comply with or **exceed specifications** laid down by the Armed Services Procurement Branches.

At final testing stations each production lot is given 100% test and inspection. Our belief is that a single failure out of a thousand may satisfy any sampling requirement, but it may be extremely costly to the consumer. Our investment in precision testing devices and extensive laboratory equipments is great, but its worth is reflected in our national reputation as producers of quality components.

Comprehensive reports are maintained by inspection centers located at strategic production points. These reports are summarized weekly, and it is quite significant to note that both the President of the Company and the Vice-President and Chief Engineer meet each Saturday morning with supervisors, engineers and military representatives to discuss the various problems indicated by process averages, and yield analyses for each production department.

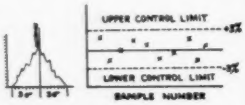
In these days when every hour taken from the production job is spared grudgingly, we still take these hours every week to analyze and combat any threat to quality performance. Increasingly rigid specifications for dimensional and operational characteristics have shown very clearly that control of quality can be achieved and maintained only by rigorous application of all the techniques and tools we are employing.

No greater assurance of excellence may be given than that which has established our reputation. Our fixed objective will always be to maintain that reputation.

AVAILABLE LITERATURE

JAN C-25 APPROVED CAPACITORS:
Refer To Jan C-25, "Specifications"

POWER-FACTOR CORRECTION CAPACITORS:
Sections I, II, III, IV, Catalog No. 27



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1. The name and address of the publisher, editor, and business manager is:

Publisher, McGraw-Hill Company of California.....68 Post St., San Francisco 4, Calif.
Editor, George C. Tenney.....68 Post St., San Francisco 4, Calif.
Managing Editor .....None
Business Manager, T. H. Carmody, Jr.....68 Post St., San Francisco 4, Calif.

2. The owner is: McGraw-Hill Company of California, 68 Post St., San Francisco 4, Calif.: Sole stockholder: McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York 36, N. Y.: Stockholders holding 1% or more of stock: Curtis W. McGraw and Donald C. McGraw, Trustees for Harold W. McGraw, Curtis W. McGraw and Donald C. McGraw, all of 330 West 42nd Street, New York 36, N. Y.: Curtis W. McGraw and Harold W. McGraw, Trustees for Catherine M. Rock, 330 West 42nd Street, New York 36, N. Y.: Curtis W. McGraw, 330 West 42nd Street, New York 36, N. Y.: Donald C. McGraw, 330 West 42nd Street, New York 36, N. Y.: Mildred W. McGraw, Madison, New Jersey: Grace W. Mehren, 536 Arenas Street, LaJolla, California: Touchstone & Company, c/o The Pennsylvania Company, 15th and Chestnut Streets, Philadelphia 1, Pa.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent of total amount of bonds, mortgages, or other securities are: None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

GEORGE C. TENNEY, Editor

Sworn to and subscribed before me this 21st day of September, 1953.

[SEAL] DOLORES COWLES

Notary Public in and for the City and County of San Francisco, California (My Commission expires Oct. 28, 1956.)

• **San Francisco, Los Angeles** and **Seattle** have been designated district headquarters of Westinghouse Electric Corp. The three former branch areas will be known as the Central Pacific, South Pacific and North Pacific districts. Under the new set-up, **Walter J. Maytham,** formerly Pacific Coast district manager, is Pacific Coast regional manager. **Harold G. Rethmeyer,** former San Francisco branch manager, becomes Central Pacific district manager; **Stanley M. Johns,** former Los Angeles manager, becomes South Pacific district manager, and **Kendall L. Howe,** former Seattle manager, becomes North Pacific district manager.

• **Managerial changes** in General Electric's Pacific Southwest district have moved **H. H. Bullock** from the Phoenix office, where he was manager, to Los Angeles, where he will assume his new duties as manager of sales for the district. Also promoted was **V. B. Miller,** formerly an industrial sales engineer in the Los Angeles office, who became manager of the Riverside office. He takes the place of **C. H. Holland,** who left Riverside to take over Bullock's former position at Phoenix. Other district changes affect **Fred Garrison,** former assistant manager of the apparatus utility sales department in Los Angeles, who became manager of apparatus product sales for the new district, and **John E. Pendleton,** who took over new duties as manager of component product sales for the district after serving as supervisor of fractional horsepower motor sales in the company's Los Angeles office.

• **A. B. Young,** district credit manager at Seattle for Graybar Electric Co., has been transferred to Los Angeles as credit manager of the Pacific District. He has been succeeded at Seattle by **C. C. Bradbury,** formerly credit manager at Minneapolis.

• **K. D. Leavitt,** sales representative in Denver for Graybar Electric Co., was promoted to district sales promotion manager in Kansas City. Leavitt, in Denver for 10 months, will direct sales promotion in six states.

• **The Thomas & Betts** Co. has moved its San Francisco headquarters to 645 Phelps St., where it has offices and warehouses. **E. L. Johnson** is branch manager.

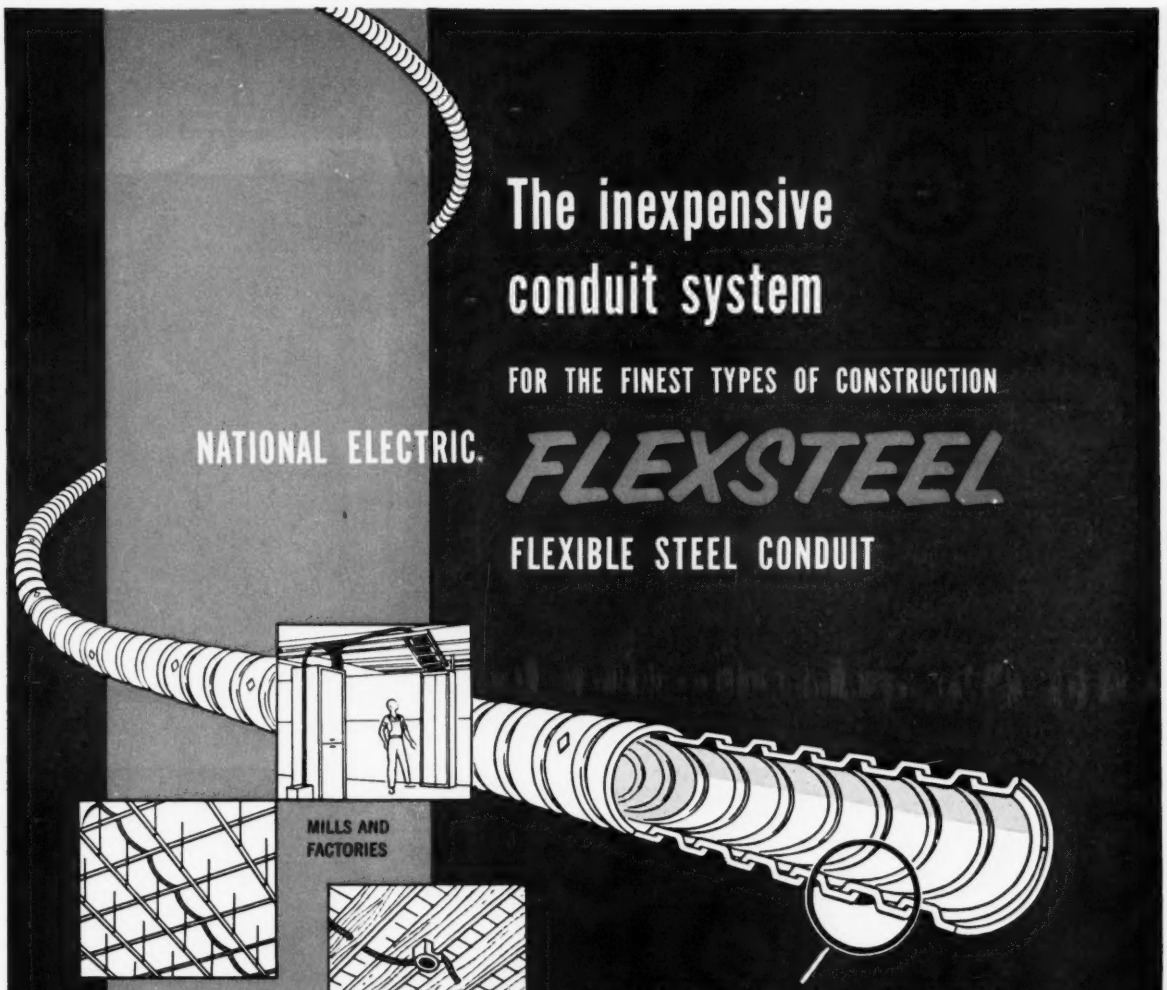
• **Lyle D. Robar** has been added to the staff of Supreme Lighting Co. as purchasing agent. Manufacturers of fluorescent lighting fixtures, Supreme's headquarters are in Los Angeles.

The inexpensive conduit system

FOR THE FINEST TYPES OF CONSTRUCTION

NATIONAL ELECTRIC. **FLEXSTEEL**

FLEXIBLE STEEL CONDUIT



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Chateau Ufer MacNabb

When Herb Ufer, center, retires in November, after more than 20 years as Western superintendent for Underwriters' Laboratories Inc., Henry J. Chateau, left, of Portland, will move to Los Angeles to take over. With them is James A. MacNabb, engineer, San Francisco laboratory of Underwriters'

Swinghamer

Busy these days with new street lighting and line extensions are E. B. Hornbaker, superintendent, and J. Cusack, assistant superintendent of line construction for the Southern Colorado Power Co. at Pueblo

William C. Swinghamer recently was named manager, district application data and training department for Westinghouse Electric Corp., with offices in San Francico

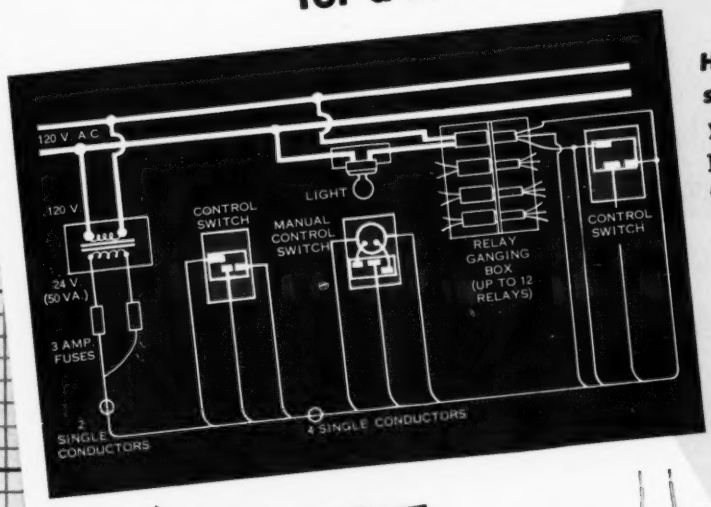
E. W. Bullard, president of E. D. Bullard Co., San Francisco, has been appointed to the research committee of President Eisenhower's committee on occupational safety

Bullard

Hornbaker Cusack

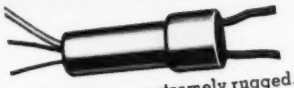
The Swing is to LOW VOLTAGE CONTROL

. . . and you'll prefer SQUARE D for a lot of reasons

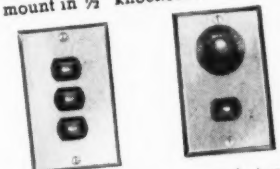


Here is a low voltage remote control system with all the features you've wanted . . .

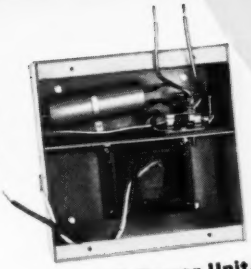
Because it saves so much installation time, the cost of this very flexible system compares favorably with conventional systems. Actually less, in many cases. It offers a super-convenient means of switching lighting and appliance circuits. It has scores of applications—in homes, office buildings, schools, churches, warehouses, factories.



Relays are extremely rugged. 20 amperes, 120 volts A.C. Also 20 amperes, 277 volts A.C. for low voltage control of high voltage fluorescent lighting. All relays mount in ½" knockouts.

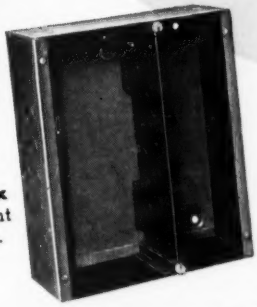


Control Switches are toggle type and fit Despard plates and straps. One, two, or three control switches (*left, above*) or one **Manual Selector Switch** and one control switch (*right, above*) can be mounted on a single strap. Manual selector switch controls from 1 to 9 circuits. Key-operated switch also available.



D.C. Power Unit, designed for consistent and trouble-free service. Eliminates A.C. hum.

Relay Ganging Box for speedy, convenient and quiet installations.



Master Controller automatically controls up to 23 individual circuits from any location.

Write for Low Voltage Control Bulletin.

Address
Square D Company,
4335 Valley Blvd.
Los Angeles 32, Calif.

ASK YOUR ELECTRICAL DISTRIBUTOR FOR SQUARE D PRODUCTS

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Vertical break. Three pole. Single throw. Group operated.

One Pole Shown.

SILVER TO SILVER CONTACTS

Planned lighting pays big dividends

With the help of a visibility meter, the lighting engineer above is determining if illumination is correct for the job. Similar surveys have helped other manufacturers boost production as much as 15%! Chances are planned lighting will do the same for you, and you pay nothing to find out.

Inspection problem solved. The Tea Garden Products Company of San Leandro found overhead lighting inadequate for inspecting preserves and jellies. After a survey, our engineers recommended a glass inspection table lighted from beneath. Result: faster, more accurate inspection.

Improved lighting for artists. The work of this silk-screen artist was once hampered by shadows and reflected glare. A free survey by our engineers for the Velvetone Company of San Francisco resulted in high-level, shadowless illumination. Now the artists do better work in less time.

For free planned lighting advice, call your nearest P. G. and E. office today

P·G·and E·

PACIFIC GAS AND ELECTRIC COMPANY

10X-53

What's in a Name?

Protoceratops

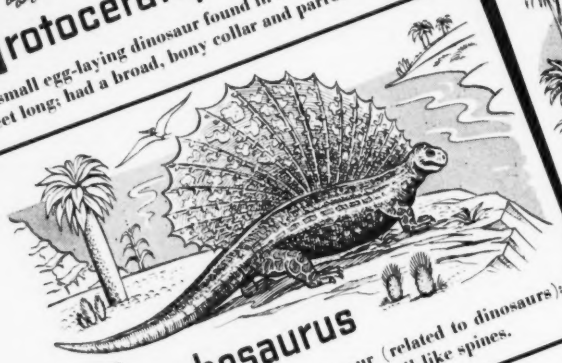
A small egg-laying dinosaur found in Mongolia; about six feet long; had a broad, bony collar and parrot-like beak.

Camarasaurus

A large, plant-eating dinosaur found in middle-western United States; 80 feet long including neck and tail.

Allosaurus

A meat-eating dinosaur 35 feet in length with strong hind limbs, claw-like hands, large skull, dagger-like teeth.



Edaphosaurus

A small, plant-eating pelycosaur (related to dinosaurs); about six feet long with grotesque sail-like spines.

. . . these uncommon dinosaurs by any other names would still be uncommon!

P.C.E.A. is uncommon, too. But we're far from being such old fossils as the giant long-dead reptiles you see above. There's nothing prehistoric about us at all. We're a wide-awake up-to-date "do something" trade association with an impressive 36-year record of accomplishment behind us and a beckoning future of continued service to the electric industry ahead.

We have no room for "fossils" in P.C.E.A. Our more than 4,000 members, from 321 different companies and all branches of the electric industry, are far too busy working to improve the industry's service to its customers for that. And it's a big job—one that belongs to and benefits all of us. If you would like to take an active part in the work of our uncommon organization, contact either one of our offices for full information.

Pacific Coast Electrical Association

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